

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**  
**(M.P. Government Undertaking)**  
**Marketing Department**  
**1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal**  
**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**SET OF TECHNICAL BID AND PRICE/COMMERCIAL BID/FINANCIAL OFFER DOCUMENTS**

- A.** Disclaimer
- B.** Instructions to Tenderers
- C-1.** Qualification Criteria (Commercial)  
**C-2** Qualification Criteria (Technical)  
**C-3.** General Terms & Conditions  
**D-I** VENDOR ENROLLMENT FORM  
**D-II** COMPLIANCE OF TENDER (AFFIDAVIT)  
**D-III** Format of Manufacturer, s Authorization for camera
- D-IV** Format of Manufacturer, s Authorization accessories other than camera  
**D-V** Format of information to be provided by the Tenderer as manufacturer  
**D-VI** Format of information to be provided by the Tenderer as a dealer / distributor
- E.** Specification of the product
- F.** Rate Proforma (Form No. 1) Price/Commercial Bid/Financial Offer  
**G.** Format- Annexure -A  
**H** CERTIFICATION SHEET Annexure -B

**[A] DISCLAIMER**

1. Though adequate care has been taken in the preparation of this Tender Documents, the Tenderer should satisfy himself that the Documents is complete in all respects. Intimation of discrepancy, if any, should be given to the Marketing Department of the MPLUN immediately. If M.P.LUN receives no intimation, it shall be deemed that the Tenderer is satisfied that the Tender Document is complete in all respects.
2. MPLUN reserve the right to reject any or all of the Bids submitted in response to this Tender at any stage without assigning any reasons whatsoever.
3. MPLUN reserves the right to change any or all of the provisions of this Tender. Such changes would be intimated to all parties procuring this Tender Document.

**(B) INSTRUCTIONS TO TENDERERS**

1. Bidders are required to carefully read above documents and then submit documents, after affixing digital signature on each page of the documents as a token of acceptance, should be uploaded on the e-Tender portal.
2. Document "F" i.e. Rate Performa should be duly filled up and digitally signed failing which the tender will be considered null and void..
3. Tenderers are expected to examine and go through all terms and conditions and instructions contained in these documents also, and ensure that all the information is furnished in the desired manner.
4. **The Bids are invited under two bid e-Tendering system in which tendering process will be completed in following stages:**

Stage of Tendering	Scheduled Time	Scheduled Date
Opening of EMD	15:00 hrs.	
Opening of Techno-commercial bid (Containing Pre-qualification and Technical bid)	16:00 hrs.	
Opening of Price Bid	15:00 hrs.	(Tentative)

5. Each stage will take place on the date and time mentioned against them.

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6. **The registration fee Rs. 2,500/- plus service tax for SSI unit of M.P. and Rs. 3,500/- plus service tax for others than SSI and an amount of EMD/Performance Guarantee Rs. 2,00,000/- will be paid through DD in favour of Madhya Pradesh Laghu Udyog Nigam Ltd., payable at Bhopal before the last date and time of bid submission. The letter of payment should be addressed to:-  
The Manager (Tender)  
Marketing Department  
MP Laghu Udyog Nigam Ltd.,  
Panchanan Bhavan, TT Nagar,  
Bhopal – 462 003**
7. During preparation of the “Techno Commercial Bid” (Technical Proposal) & Price Bid (Financial Proposal). Tenderer must give particular attention to the following:
- (i) The each page of the documents including specifications must be signed by using digital signature of an authorized signatory.
  - i. The Price Bid of only those Tendering Units will be opened who meet Qualification Criteria and requirements of technical Specification of the Tender as well.
  - ii. Under this system of bidding the tenderers is to qualify for each stage before the next stage takes place.
  - (iv) MPLUN Reserve the right to inspect any tendering unit at any time during working hours, as and when required.
8. All tender documents shall be uploaded in JPG or PDF format only, in minimum resolution of 600 DPI.
9. The Hard copies of complete technical bid including qualification criteria and related documents/technical literature/brochure duly attested shall also be submitted in the tender box of marketing dept. On or before due date and time of the tender.
10. In case of any non clarity of uploaded documents on any dispute over documents up loaded in E-tender, the hard copies submitted by the Tenderer shall be treated final.
11. The unit which offered the lowest rate (L-1) will be given preference in order placement alongwith other consideration.
12. The rates shall be applicable for One year from the date of opening of Commercial Bid.
13. Provisions of Store Purchase Rules ( as amended from time to time) and the State Government's Circular No. F-12-2/94/11/A dated 05/04/1995, Circular No. F-12/40/92/11/A dated 04/09/1992 and Circular No. F-6-7/05/A/11 dated 08/02/2005 shall also be applicable.
14. **The bidder's are instructed to fill the rates in prescribed price schedule available on Portal. Price schedule should not be submitted in Hard Copy , other wise tender shall be rejected.**

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**[C-1] Qualification Criteria (Commercial)**

<b>Sr. No</b>	<b>Criteria (Commercial)</b> (Documents required as follows are compulsorily to be submitted on e-portal)	<b>Mention Compliance Yes/No</b>	<b>Attachment file name</b>
1.	EMD/Performance Guarantee ₹. 2.00 Lakhs (with document)		
2.	TIN No. ....(with document)		
3.	PAN No. .... (with document)		
4.	Affidavit for Compliance of Tender conditions: Affidavit on Stamp paper regarding compliance to tender specifications and Terms & Conditions must be submitted as per Proforma attached at D-II.		
5	<b><u>Turnover</u></b>		
5.a	The manufacturer(OEM) of <b>CCTV camera</b> must have turnover min. 50 Crores during any one of last three years. The balance sheet/ certificate duly certified by CA must be submitted.		
5.b	<u>Tenderer</u> must have turnover min. 10 Crores during any one of last three years . The balance sheet/ certificate duly certified by CA must be submitted.		
6	<b>In case of Micro &amp; Small Scale Units of M.P:</b> Micro & Small Scale Units having registration with DTIC / DIC are exempted from above turnover condition.		

**Note:** The bid not fulfilling above criterion/criteria shall be liable for rejection.

**Place:**

**Date:**

**Company seal with  
Name & Signature**

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**[C-2] Qualification Criteria (Technical)**

<b>Sr. No</b>	<b>Criteria (Technical)</b> (Documents required as follows are compulsorily to be submitted on e-portal)	<b>Mention Compliance Yes/No</b>	<b>Attachment file name</b>
<b>1.</b>	<b>Eligibility for Participation:</b>		
	<u>The tenderer must be CCTV Camera manufacturer/their Indian Counterpart/corporate or authorized Importer or their single sole authorized System Integrator for this tender, under whose jurisdiction State of Madhya Pradesh fall. The tenderer must be able to integrate the CCTV System by sourcing other required related accessories/products from different manufacturers.</u>		
<b>2</b>	<b>Experience</b>		
	Tenderer must have experience of integrating and implementing the 12 number of CCTV (outdoor) System installations, each comprising of minimum eight camera configuration during last two financial years in Government / PSU sector/Corporate sector. (The copy of Purchase orders and their satisfactory installation report from user must be submitted).		
<b>3.</b>	<b>Manufacturing Registration Certificate:</b> (to be submitted by the tenderer whether manufacturer or for OEM if tenderer is Indian counter part/importer or authorized System Integrator of manufacturer / Indian counter part / importer)		
<b>3.A</b>	<b><u>In case of Micro &amp; Small Scale Units of M.P.:</u></b> Self certified copy of Registration Certificate/ Acknowledgement of (EM-Part-II) issued by DTIC/DIC along with copies of respective “ <b>Memorandum Part-II</b> ” submitted to DTIC/DIC for manufacturing of <b>Tendered Item</b> .		
<b>3.B</b>	<b><u>In case of Medium &amp; Large Scale Units and units outside the state:</u></b> Unit’s Registration certification by any ‘ <b>Statutory Competent Authority</b> ’ for manufacturing of <b>tendered item</b> . “ <b>OR</b> ” Self certified copy of valid <b>ISO certification</b> for manufacturing of tendered item.		
<b>4.</b>	<b>Manufacturer’s/Indian counterpart’s/Importer’s Authorization:</b> Tenderer in case of Indian counterpart/Importer must submit the authorization from manufacturer and In case of System Integrator must submit authorization issued by Indian counterpart / importer along with authorization issued to Indian counterpart/importer by the manufacturer.		
<b>4.a.</b>	By the manufacturer of CCTV camera, in the prescribed format attached herewith at “ <b>Annexure-D-III</b> ”.		
<b>4.b.</b>	By the manufacturer of accessories other than CCTV camera such as NVR,VMS, Display, network devices, Wireless devices, and servers, Storage, Desktops and Network Service Provider in the prescribed format attached herewith at “ <b>D-IV</b> ”.		
<b>5</b>	<b>Certification: All the quoted CCTV camera (except UVSS Camera) Product must be UL, CE and FCC certified (Certificate must be enclosed in Hard Copy Super-scribing the Sub item code on each certificate))</b>		
<b>6</b>	<b>IEC Code of Importer</b>		

**Note:** The bid not fulfilling above criterion/criteria shall be liable for rejection.**Date :****Place:****Company seal with Name & Signature**

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-A

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**Note to Tenderer:**

1. Authorization (D-III) , (D-IV) and Quality Certification of the product in the tender must be in English only or original certificate with translation in English from Government recognized translator otherwise the tender is liable to be rejected.

2

2. The Tenderer shall submit Self certified copy of Feasibility Report issued by MPLUN/DGS&D Registration certificate for tendered item, issued in favor of manufacturer not more than three years before the due date of Tender.

“OR”

Desired information for ‘Feasibility Study’ (in VENDOR ENROLLMENT FORM enclosed as ‘Annexure-D1’ in tender document) and ‘Feasibility Fee’ (₹1000/- + applicable Service Tax for MP State based units and ₹5000/- + applicable Service Tax for Outside of MP Units) in the form of DD in favor of ‘MP LaghuUdyog Nigam Ltd, Bhopal’. The Rate Contract shall be executed only with those bidders who are qualified in tender and found feasible in Feasibility study.

In addition to above the tenderer can also get their industrie's feasibility study done by RITES/ IRS / SGS / Any Government Engineering College at their own cost. However, it is mandatory that unit's production capacity (annual) should be categorically mentioned in the feasibility report. Validity of feasibility report will be 03 years. Feasibility study report must be submitted before execution of Rate Contract

List of Documents to be submitted in hardcopy:

- i. Self certified copies of documents desired in [C-1] Qualification Criteria (Commercial).
- ii. Self certified copies of documents desired in [C-2] Qualification Criteria (Technical).
- iii. Duly sealed & signed and filled-in (wherever required) Tender documents, Specifications and Terms & Conditions.

PLACE:

DATE:

Seal & Signature of tenderer

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**C-3. Additional Terms and Conditions**

(To be submitted with Technical Bid)

Sr. No.	Terms & Conditions
1	<b>There is a probability of Business of Rs 200 crore in M.P.during the year.This amount may increase/decrease further during the currency of rate contract</b>
2	In case of non-submission/non-availability of desired information and documents in the Technical Bid, the Technical Bid shall be rejected and submission of related information/documents later will not be accepted.
3	The bidder(s), penalized by any Govt. Deptt./Semi Govt. Deptt., Institution or PSU or marketing facility/assistance extended to them is withdrawn, are not eligible for participating in MPLUN's Tender, during the period of such penalty(s). Wherever, in such cases the period of penalty imposed is not specified, it will be treated for 02 years. If the Bidder states that they are not penalized or their marketing facility/assistance is not stopped, as above, they must submit an affidavit on appropriate value of stamp paper, duly notarized, to this effect.
4	Since, the tenders are invited for Rate Contract, the volume of business, under item name C.C. TV System, carried out by MPLUN, for the information of Bidders, during last two financial years is as follows:
5	Year 2012-13 Rs. 178.69 Lacs
	Year 2013-14 (upto JAN.14) Rs. 220 Lacs
	The above detail is merely for the information of the bidder and the quantum of business for forthcoming Rate contract shall depend upon the requirement from Govt. Departments.
6	The tenderer should quote rates for Onsite comprehensive guarantee/warranty of minimum three years from the date of successful installation & commissioning of complete system. Tenderer should give guarantee for availability of spare parts and consumables for a period of minimum five years from the date of installation.
7	Tenderer should furnish rates and information separately for accessories, if any required additionally.
8	The Tenderer shall also quote charges for annual maintenance contract, which should be applicable only after expiry of the guarantee/warranty period.
9	Tenderers shall furnish original technical literature in two sets with the tender.
10	Deviation from tender specification, tender conditions etc. must be clearly mentioned and should be indicated wherever applicable against the tender specification.
11	The quoted rates shall be FOR destination any where in Madhya Pradesh, inclusive of excise/custom duty, 2% LUN's service charges, 0.5% inspection charges, and applicable Service tax, installation and commissioning , transit, insurance, packing, forwarding, and freight, but exclusive of sales/commercial tax VAT etc.
12	Rates should be quoted as per prescribed Performa only.
13	Tenderers should submit a checklist indicating the matching of specification of quoted model with the tender specification, failing which their offer shall be liable for rejection. Any deviation from the specification must be clearly indicated against respective parameter/requirement of specification.
14	Training: -Tenderer have to provide necessary training to consignee's staff for smooth operation.
15	The Bidder shall attach a copy of the Rate Performa duly filled in with the details of quoted items and its Make/Model, without mentioning the Price. There must be clear mention of "Quoted" or "Not Quoted" in the column of Price, against each item Instead of mentioning the price, else the item(s) without any mention shall be treated as not quoted and rates for such items shall not be opened.
16	Manufacturing units belonging to SC/ST category (in M.P.), if available in the rate contract, shall get 30% quantum of total supplies or their capacity (whichever is less).
17	The rates shall be applicable for one year from the date of opening of the commercial bid.
18	Provisions of Store Purchase Rules (as amended from time to time) and the State Government's Circular No. F-12-2/94/11/A dated 05/04/1995, Circular No. F-12/40/92/11/A dated 04/09/1992 and Circular No. F-6-8/03/11/A dated 19/02/2003 may be applicable, as and when required.
19	Tenderer quoting higher than 25% of L-1 in case of SSI unit of MP and higher than 10% of L-1 in case of units outside M.P. shall normally not be allowed to execute rate contract with MPLUN. MD has discretion to allow execution of rate contract on approved rate with any such unit.
20	The lowest rate quoting Bidder(s) shall be given top priority for placement of Supply Orders.
21	All the specification should be filled in format provided in Technical specification of LUN.

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22	Original catalogue of manufacturer should be provided in hardcopy of tender and dealer or marketing vendor's Printed catalogue will not be acceptable.
23	All specifications mentioned in technical format of LUN should be available in catalogue of manufacturer. If any specification is not available in the catalogue it should be mentioned in operational manual, which need to be provided with the tender otherwise it will not be considered.
24	<b><u>The machine(s)/Equipment shall be inspected after installation jointly by Purchasing Department and agency mentioned in the supply order.</u></b>
25	In one category the Tenderer must quote only one best suitable model, else the offer shall be liable for rejection.
26	All the documents must be self attested by the tenderer.
27	Please follow the instructions as mentioned in terms & conditions.
28	The machine(s) shall be supplied with all standard accessories.
29	Tenderers those are having Rate Contract with DGS&D or any other Government Department are required to submit copy of the same with this tender offer. Tenderer quoting rates as Dealer on behalf of manufacturer should submit certified copy of prevailing Dealer price/MRP along with tender.
30	The Tenderer shall also submit a self certified copy of Service Tax Registration for the authorized Service Centres stated in the tender.
31	Any condition, other than specified in the tender, shall not be acceptable.
32	<b><u>Packing and Transportation:-</u></b> The supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. The bidders shall cover transit insurance for value of the materials to be transported. Each packing should include, packing list containing all details of hardware packed with serial Nos. and quantity. The successful bidders shall be responsible for transportation and installation of all the equipment at site. All the ordered equipment will be transported, installed, and commissioned by the bidders. The bidders shall bear all additional taxes (Toll Tax, RTO Tax etc.) during transportation.
33	Accessories: Detailed information / check list for necessary accessories to be supplied with the Equipment should be provided to the purchaser.
34	Precautions: All the tendering units must provide literature containing all precautions related with safety measures during operation, preferably in Hindi.
35	Marking: Each packing shall be marked with the following
A	Manufacturers name and trade mark
B	Supplied through MPLUN
36	<b><u>Demonstration: The tenderers are required to demonstrate the Equipment as and when asked by MPLUN at desired location, at their own expenses, before opening of the price bid and the price bid of only those products shall be opened which are found qualified in the demonstration.</u></b>
37	<b>The tenderer has to submit 10% PERFORMANCE GUARANTEE or as decided, value of supply order in the form of BG/FDR with the Nigam or indenting department which will be released after Defect Liability Period of one year, however the individual components shall have standard warranty / guarantee period as per the specification mentioned below.</b>
38	The tenderer must submit the Certification Sheet for all the certifications desired for individual item (as mentioned in the certification sheet-'H'). The products without desired certifications shall not be considered for opening of rates.
39.	The Purchasing Deptt. shall make necessary arrangements for protection of installed system by Rodent or unauthorized officials. Purchasing Deptt. shall be responsible for any damage/mal-functioning of the system due to these reasons.

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Sr. No.	Terms & Conditions
40	Tender specifications are minimum requirement and the tenderer may quote same or higher. In case there is any lower side minor deviation from the tender specifications, that must be mentioned and the committee shall take decision on acceptance of product in view of nature and gravity of deviation.
41	The installation site (for fixing ordered products/poles) whether indoor/outdoor alongwith necessary applicable permissions must be provided by the purchasing department at their own cost at the time of raising the indent. There shall not be any separate payment to the unit for this purpose.
42	The supplier unit must submit approximate lay out of proposed system to the purchasing department.
43	Amendment in the supply order shall be issued after information is made available for actual quantity utilized in installed CCTV system.
44	Supply order for one indent shall preferably be placed on one supplier unit subject to products available on rate contract.
45	Model upgradation of quoted product must be informed well in advance (at least one month) and it will be perview of MPLUN to consider the up gradation.
46	So far as products/accessories/components other than CCTV camera are concerned, any one of the specified (if any) Make/Brand must be quoted duly supported by authorization from manufacturer for availability of post installation Guarantee and warrantee of Three years.
47	Wherever makes/brands are specified for a particular product/accessory/component, then only those make/brand specified product/accessory/component shall be quoted and utilized for integration of CCTV System along with appropriate authorization from manufacturer.
48	Payment Terms (All the part payments shall be supported by BG of the minimum period of one year or as applicable and BG shall be released after successful completion and handing over the Assignment.)
A	50% of the cost of material will be paid against Delivery and Inspection of material on submission of Bank-Guarantee.
B	25% will be paid against successful installation ,testing and commissioning.
C	25% will be paid against establishment of work, acceptance and after three month of satisfactorily commissioning of CCTV System.
	<u>The said Payment Terms are for reference only and shall be subjected to mutual agreed terms with End User.</u>
49	<b><u>Warranty:</u></b>
A	Items supplied against MPLUN Supply order, should be covered under on-site COMPREHENSIVE warranty for a period of three years as mentioned in Rate proforma, from the date of successful installation, commissioning and acceptance of the equipments of that <b>supply order</b> , against bad workmanship, manufacturing defects, etc.
B	For Maintenance during warranty period, the bidder can be himself or bidder's authorized service provider. However, the bidder should give a single contact point, for providing after sales support and maintenance activities of the related equipment.
C	The bidder must have an office in Madhya Pradesh for coordinating after sales related matters. The office should have Dedicated Staff, Telephone/Toll free No., for registration of complaints.
D	The bidder must provide a web based software solution within 3 months, from the date of contract alongwith user manual for raising, maintaining and monitoring complaints logged by users. The software shall be operated and maintained by the successful bidder in their own office site.
E	The bidder must set centralized managed facility for various purchaser departments of MP to log complaints related to any problems in the CCTV System. The complaint logging facility should be available from 10.30 A.M. Hrs. to 6.00 P.M. Hrs. , all seven days a week, except GoMP declared holidays through voice call and SMS. In this regard, the supplier should provide complaint ID Nos. as well as redressal messages to the user through SMS, by e-mail.
F	During warranty period, the down-time of any equipment will be accounted, if the fault/defects are not repaired within three working days and replaced within 7 working days. If it exceeds 7 days, the Service Provider may be imposed a penalty of a sum of Rs.200/- for each and every calendar day delay, from the day of fault reporting of respective location.
G	Warranty certificate for each system and for all the equipments supplied should be provided along with the invoice.



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50	<b>After Sales Service:</b> The bidder should have its own service centre / authorized support partner in Madhya Pradesh, with a team of trained service engineer / technical staff the details in this regard as per Annexure-VII shall be submitted. In case at the time of tender service center is not available in M.P. then he shall submit an undertaking to establish the service center before the award of contract. The bidder should also submit list of Service Center in India alongwith Toll free number (if any) and web based service support.
51	<b>Authorization (D-III and D-IV) and Quality Certification of the product in the tender must be in English only or original certificate with translation in English from Government recognized translator otherwise the tender is liable to be rejected.</b>
52	All the Product certificates enclosed with tender must be countersigned and verified by the issuing authority.
53	Balance sheet submitted in the tender must be countersigned and verified by the Chartered Accountant.
54	The MD, MPLUN reserves the right to accept any tender, irrespective of lowest quote, or reject any one or all tenders, without assigning any reason.
55	We have read the above Terms & Conditions carefully and accordingly prepared the tender. We also agree to strict adherence of above including all tender conditions.

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**[D-I] VENDOR ENROLLMENT FORM**  
(Information to be submitted by the Manufacturer for Feasibility Study)

<b>Name of Proprietor / Partners / Directors</b>								
<b>Designation of Concern Person</b>								
<b>Name of the Firm / Unit / Company</b>								
<b>Legal Status of the Firm / Unit / Company</b> [Tick (✓) the applicable or specify]	Proprietorship		Partnership		Pvt. Ltd.		Co-op. society	
					Ltd.		Any other (Pl. specify) .....	
<b>Type of Business</b> [Tick (✓) the applicable or specify]	Manufacturing		Assembling		Service Industry		Any other (Pl. specify) .....	
<b>Office Address</b>								
<b>Factory Address</b>								
<b>Office Phone No.</b>	No(s).				Name of contact person:			
<b>Mobile No.</b>	No(s).				Name of bearer:			
<b>E-mail ID</b>								
<b>Gross Annual Sales / Revenue</b>								
<b>Details of Products for which Enrolment is desired</b>	<b>Sl. No.</b>	<b>Name of Products(s)</b>			<b>Date of Commencement of Production</b>		<b>Registered Capacity</b>	
	1							
	2							
	3							
	4							
<b>Industry's Registration Details</b>	Permanent Registration no. of DTIC OR Entrepreneur's Memorandum No. Issued by DTIC ( EM Part - II)				No.:			
					Date:			
<b>Details of Main Machines Installed for Production of items for which Feasibility Study is required.</b>	<b>Sl. No.</b>	<b>Name of Machine(s)</b>		<b>Type / HP</b>		<b>Qty.</b>	<b>Year of Purchase</b>	
	A	Manufacturing :						
	B	Quality Control:						

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<b>Manpower</b>	For Production	..... Numbers
	For Quality Control	..... Numbers
	For Office Staff	..... Numbers
<b>Electric Power</b>	Domestic / Commercial / Industrial	
<b>Electricity Phase</b>	Single Phase / Three Phase	
<b>DG Set</b>	Yes/No. If yes, mention capacity HP/KW	
<b>Land / Building / Shed</b>	Total Plot / Land Area	.....Sq.Ft.
	Administrative	.....Sq.Ft.
	Production Shed	.....Sq.Ft.
<b>Ownership</b>	Owned / Rental	
<b>Turnover : Last Two Years</b>	Year	Turnover ₹.....Lacs
	Year	Turnover ₹.....Lacs
<b>Quality Certification</b>	BIS License No. ....	Date of issue..... Date of Validity.....
	Any other license No. (Pl. specify ... ..... .)	Date of issue..... Date of Validity.....
	Feasibility Report Carried out By M.P.L.U.N. vide No. ....	Date of issue.....

**Note:** In support of above information, clear & readable self certified copies of respective documents must be submitted with hard copies of Tender documents.

**DECLARATION**

I hereby declare that information submitted in the prescribed format is true and correct. If MPLUN finds any information false or we unable to submit original document on demand, the MPLUN has full right to take appropriate/legal action against us.

**Company seal with Name & Signature**

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.  
(M.P. Government Undertaking)**

**Marketing Department  
1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal  
Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**[D-II] COMPLIANCE OF TENDER (AFFIDAVIT)**

**DECLARATION/UNDERTAKING**

(To be submitted on Stamp Paper of requisite value duly notarized)

I/We .....M/s .....  
Represented by its Proprietor/Managing Partner/Managing Director, having its Registered Office at ..... do hereby declare that I/We have carefully read all the conditions of Tender No. .... For supply of ..... (Name of Item) floated by the Madhya Pradesh Laghu Udyog Nigam Ltd., Bhopal – 462 003 and accept all conditions of Tender. We have quoted the rates as per tender specification and terms & conditions.

I/We agree that the M. P. Laghu Udyog Nigam Ltd. can take action as per tender condition(s) & specification(s), if, any information furnished by us proved to be false at the any time of inspection/verification.

Signature: .....

Name & Designation: .....

Address: .....

Mobile No.: .....

Seal

To be attested by the Notary

**List of Documents to be submitted in hardcopy:**

- i. Self certified copies of documents desired in [C-1] Qualification Criteria (Commercial).
- ii. Self certified copies of documents desired in [C-2] Qualification Criteria (Technical).
- iii. Duly sealed & signed and filled-in (wherever required) Tender documents, Specifications and Terms & Conditions.

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**  
**(M.P. Government Undertaking)**  
**Marketing Department**  
**1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal**  
**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**[D-III]** (To be submitted with Technical Bid)  
CCTV Camera Manufacturer's Authorization Letter Notarized  
(On Manufacturer's Letter Head, duly notarized, to be submitted with Technical Bid)

Ref. No. -----

Dt. -----

To,

Managing Director,  
M.P. Laghu Udyog Nigam Ltd,  
4th Floor, Panchanan Bhavan  
Bhopal.

Subject: Authorization for participation in the tender for quoting our products and after sale support for products as per tender requirements.

Ref.: Tender No. KE-----A for -----

Dear Sir,

We, M/s. ----- who are established ~~and~~ reputed manufacturer/Indian counterpart's/Importer's for the item ----- having factory/Company's Registered Office at -----  
----- (Full address, Phone/Fax/ e-mail address etc.) Do hereby authorize only to M/s. -----  
----- (Full address, Phone/Fax/e-mail address etc.) to submit the Bid and subsequently negotiate and sign the rate contract with MPLUN against above referred Tender for ----- (Name & Make of quoted products). A list of product with Model detail, duly certified by us, is also enclosed herewith for which the above said Bidder is authorized in the tender.

We hereby extend our full guarantee & warranty as per terms & conditions of the above tender for goods & services offered by the above dealer / distributors against this tender. We hereby declare that we will be held fully responsible for any violation of tender terms and condition done by our dealer / distributors. In such cases, the penalty may be recovered from us. We also confirm to provide the spare for at least five years from the date of supply / installation. We assure that goods ordered on the above firm shall be supplied in due time.

It is also hereby certified that M/s. ----- is the only sole distributor/authorized dealer in the state of Madhya Pradesh for participating in the tender referred above.

We hereby declare that we have not been debarred / penalized by any Govt. Depts., / neither Undertaking nor our marketing assistance has been stopped / withdrawn in the past.

**The self certified copy of Power of Attorney to issue such authorization certificate is also enclosed herewith.**

Thanking you,

Yours faithfully,

Signature of Bidder with attested

For -----

Encl.: 1) List of products with category wise model detail  
for which authorization is given

Name & Designation of the Signatory

2) Copy of Power of Attorney

(Manufacturer)

**Note:** Authorization (D-III) and Quality Certification of the product in the tender must be in English only or original certificate with translation in English from Government recognized translator otherwise the tender is liable to be rejected.

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**

**(M.P. Government Undertaking)**

**Marketing Department**

**1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal**

**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**[D-IV]** (To be submitted with Technical Bid)

Manufacturer's Authorization for Accessories other than CCTV camera Letter Notarized  
(On Manufacturer's Letter Head, duly notarized, to be submitted with Technical Bid)

Ref. No. -----

Dt. -----

To,

Managing Director,  
M.P. Laghu Udyog Nigam Ltd,  
4th Floor, Panchanan Bhavan  
Bhopal.

Subject: Authorization for participation in the tender for quoting our products and after sale support for products as per tender requirements.

Ref.: Tender No. KE-----A for -----

Dear Sir,

We, M/s. ----- who are established ~~and~~ reputed manufacturer/ Indian counterpart's/Importer's for the item ----- having factory/Company's Registered Office at ----- (Full address, Phone/Fax/ e-mail address etc.) Do hereby authorize only to M/s. ----- (Full address, Phone/Fax/e-mail address etc.) to submit the Bid and subsequently negotiate and sign the rate contract with MPLUN against above referred Tender for ----- (Name & Make of quoted products). A list of product with Model detail, duly certified by us, is also enclosed herewith for which the above said Bidder is authorized in the tender.

We hereby extend our full guarantee & warranty as per terms & conditions of the above tender for goods & services offered by the above dealer / distributors against this tender. We hereby declare that we will be held fully responsible for any violation of tender terms and condition done by our dealer / distributors. In such cases, the penalty may be recovered from us. We also confirm to provide the spare for at least five years from the date of supply / installation. We assure that goods ordered on the above firm shall be supplied in due time.

It is also hereby certified that M/s. ----- is the distributor/ authorized dealer in the state of Madhya Pradesh for participating in the tender referred above.

We hereby declare that we have not been debarred / penalized by any Govt. Depts., / neither Undertaking nor our marketing assistance has been stopped / withdrawn in the past.

**The self certified copy of Power of Attorney to issue such authorization certificate is also enclosed herewith.**

Thanking you,

Yours faithfully,

Signature of Bidder with attested

For -----

Encl.: 1) List of products with category wise model detail  
for which authorization is given

Name & Designation of the Signatory

2) Copy of Power of Attorney

(Manufacturer)

**Note:** Authorization (D-III) and Quality Certification of the product in the tender must be in English only or original certificate with translation in English from Government recognized translator otherwise the tender is liable to be rejected.

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**  
**(M.P. Government Undertaking)**  
**Marketing Department**  
**1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal**  
**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**[D-V] INFORMATION TO BE PROVIDED BY THE TENDERERS AS MANUFACTURER**  
(To be submitted with Technical Bid)

1. Name of the unit
2. Year of establishment
3. Works address Tel. No.
4. Office address Tel. No.
5. Name of Director/Proprietor/Partner with address Tel.No.
6. Name of contact person with Telephone No./Cell No. & Address
7. Fax No.
8. Whether unit is Limited Co./Pvt. Ltd.Co. /Partnership Firm/Proprietary Firm
9. Registration No.
10. TIN No.
11. Registered Capacity of tendered product \_\_\_\_\_
12. Whether Excise Duty is applicable or not YES NO
13. Area of manufacturing premises( in Sq.Ft.)
  - (a) Total Plot Area :
  - (b) Total Built-up Area :
  - (c) Office Area :
  - (d) Open Area:
14. Location & Lay out plan of the unit - Enclose clear Map/Drawing
15. List of Manufacturing machines installed :-  
(Enclose separate list, if required)

Sr.No	Name of the machine, with brief specification.	Quantity
01		
02		
03		

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**  
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**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

16. List of Quality control/testing facilities available: -  
(Enclose separate list, if required)

Sr.No	Description of the facility	Quantity
01		
02		
03		

17. Details of Electric Power:-

- (a) Type of Connection HT/LT :
- (b) Connected Load in KW/HP :
- (c) Sanctioned Load in KW/HP :  
(Please enclosed Documentary Evidence along with two bills of last six months)
- (d) Power Generating Facility: YES/NO  
If yes, capacity of GeneratingSet :

18. Details of Manpower:

- (a) Managerial Staff
- (b) Office Staff
- (c) Technical Supervisor Staff
- (d) Inspection Staff
- (e) Skilled Workers
- (f) Semi-Skilled Workers
- (g) Unskilled Labors

19. List of Office Equipments (Provide Details)

20. Turn Over of the unit:      Year 2014-2015  
   Year 2013-2014  
   Year 2012-2013

21. Income Tax and Sale Tax Clearance Certificate (Enclose Details)

22. Valid Competency Certificate Issued by DIC (Enclose Certificate)

Signature of Proprietor/Partner/  
Authorized Person & Seal of the Unit



**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**  
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**1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal**  
**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**[D-VI] INFORMATION TO BE PROVIDE BY THE TENDERERS (AS A DISTRIBUTOR)**  
(To be submitted with Technical Bid)

1. Name of the unit
2. Year of establishment
3. Work address Tel. No.
4. Office address Tel. No.
5. Name of Director/Proprietor/Partner  
with address Tel.No.
6. Name of contact person with  
Telephone No./Cell No. & Address
7. Fax No.
8. Whether unit is Limited/Pvt. Ltd./Proprietary Firm/Partnership Firm
9. Name of manufacturer of whom authorization given\_\_\_\_  
(Authorization must be in the format D-III/D-IV )

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**  
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**TECHNICAL SPECIFICATIONS**  
**[E]**  
**(To be submitted with Technical Bid)**

**Network Based IP Camera**

**1. Pendant mount for outdoor camera:**

**SME 124801**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	Pl specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Features	<ul style="list-style-type: none"><li>Flexible Installations.</li></ul>
2	EMI/EMC Report	N.A

**2. Outdoor Power Box:**

**SME 124802**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	Pl specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Electrical Features	<ul style="list-style-type: none"><li>Power source - AC 220-230 V @ 50-60 Hz or 12VDC</li><li></li></ul>
2	Mechanical Features	<ul style="list-style-type: none"><li>Environment -Outdoor</li></ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sl. No.	Detail	Requirements
3	Environmental Features	<ul style="list-style-type: none"><li>Waterproof Standard - IP66</li></ul>
4	Regulatory Compliance	<ul style="list-style-type: none"><li>CE</li></ul>

**3. CS mount Megapixel vari-focal auto iris lens:****SME 124803**

Sl. No.	Detail	Requirements
	Make	PI specify
	Model	PI specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Features	<ul style="list-style-type: none"><li>Varifocal</li><li>Megapixel Lens</li><li>CS Mount</li><li>Focal Length – F2.8 - 12 mm / F1.4-360</li><li>Auto Iris / Focus Control - DC drive Manual focus</li></ul>

**4. IP 66 Certified Enclosure for Box camera:****SME 124804**

Sl. No.	Detail	Requirements
	Make	PI specify
	Model	PI specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Features	<ul style="list-style-type: none"><li>Power Supply - . 100 to 240 V AC Input or 12 V DC</li><li>Material - Aluminum Housing</li><li>Color - White</li><li>IP66 certified for weatherproof and dust proof operation</li><li>should be of same make as camera brand</li></ul>

**5. 2 Megapixel Full HD Dome camera: SME 124805**

<b>Functional Specifications</b>	<ul style="list-style-type: none"><li>The Outdoor Dome camera shall offer multiple simultaneous video streams with 2 megapixel (MPxl) 1920 x 1080 resolution, auto iris and varifocal lens with.</li><li>The Outdoor Dome camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm.</li><li>The Outdoor Dome camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0 lux in night mode with IR switched On.</li><li>The Outdoor Dome camera shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable</li></ul>
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<p>through an embedded Web browser.</p> <ul style="list-style-type: none"> <li>▪ The Outdoor Dome camera shall be conformant to the ONVIF Profile S supporting open architecture best practices</li> <li>▪ The Outdoor Dome camera shall offer local storage capture of 10-second video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.</li> <li>▪ The Outdoor Dome camera shall offer the ability to record continuous video in the case of network outage. It will be accessible through FTP protocol.</li> <li>▪ The Outdoor Dome camera shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.</li> <li>▪ The Outdoor Dome camera shall provide inbuilt simple motion detection to detect motion within a user-defined field of view or within a user specified rectangular zone. Such behaviors shall trigger an alarm.</li> <li>▪ The Outdoor Dome camera shall provide inbuilt camera sabotage analytics to detect Tampering, Tripzone, Audio Detection. This is a mandatory requirement and may be supplied through additional analytics software incase it is not present in the camera.</li> <li>▪ The Camera should be IP66 rated for outdoor performance</li> </ul>
	<ul style="list-style-type: none"> <li>• Image Sensor : 1/2.7" 2 Megapixel progressive CMOS sensor, (1920 x 1080)</li> </ul>
	<ul style="list-style-type: none"> <li>• Lens : Built-in; Vari-focal, 3.3 ~ 10 mm, DC Drive, Auto Iris</li> </ul>
	<ul style="list-style-type: none"> <li>• Minimum illumination - 0.03 lux &amp; 0Lux with IR On</li> </ul>
	<ul style="list-style-type: none"> <li>• Angle of view:(H) 35.4°, (V) 19.8°, (D) 40.5°</li> </ul>
	<ul style="list-style-type: none"> <li>• WDR - up to 65 db</li> <li>• White Balance Range - Auto</li> <li>• Digital Noise Reduction - Yes, (ON/OFF selectable)</li> <li>• Day &amp; Night Capabilities – Yes (On / Off Selectable)</li> <li>• Mechanical IR Cut Filter - Yes, (AUTO/MANUAL selectable)</li> <li>• Available language - English</li> </ul>
	<ul style="list-style-type: none"> <li>• Multiple simultaneous Triple streaming</li> </ul>
	<ul style="list-style-type: none"> <li>• Available Resolutions : 1920 x 1080, 1280 x 720, 704x480, 352x240</li> </ul>
	<ul style="list-style-type: none"> <li>• Video Format : H.264 High or Main profiles and MJPEG stream</li> <li>• Frame Rate : 30ips</li> </ul>
	<ul style="list-style-type: none"> <li>• Dual Channel Streaming</li> </ul>
	<ul style="list-style-type: none"> <li>• Line – in / terminal block</li> </ul>
	<ul style="list-style-type: none"> <li>• Audio</li> </ul>
	<ul style="list-style-type: none"> <li>• Network Interface</li> </ul>
	<ul style="list-style-type: none"> <li>• Supported Protocols - TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNTP, SMTP, UPnP</li> </ul>
	<ul style="list-style-type: none"> <li>• Network Port - RJ-45 for 100Base-TX</li> <li>• Cable Type - Cat5 cable or better for 100Base-TX</li> <li>• Input Power - PoE (IEEE802.3af, Class 2) or 12VDC</li> <li>• Local Storage - Up to 32GB on Micro SDHC or SDXC card</li> </ul>
	<ul style="list-style-type: none"> <li>• Pan/Tilt Adjustment</li> </ul>
	<ul style="list-style-type: none"> <li>• Operating Temperature 0° to 50°C</li> <li>• Operating Humidity Upto 90%</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>• UL, CE &amp; FCC</li> </ul>

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.****(M.P. Government Undertaking)****Marketing Department****1st Floor, Panchanan Bhavan, Malviya Nagar, Bhopal****Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**6. Full HD 2Mpxl Day/Night IR Bullet****SME 124806**

<b>Functional Specifications</b>	<ul style="list-style-type: none"><li>▪ The Outdoor Dome camera shall offer multiple simultaneous video streams with 2 megapixel (MPxl) 1920 x 1080 resolution, auto iris and varifocal lens with.</li><li>▪ The Outdoor Dome camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm.</li><li>▪ The Outdoor Dome camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0 lux in night mode with IR switched On.</li><li>▪ The Outdoor Dome camera shall have a mechanical IR cut filter mechanism for increased sensitivity in low-light installations. Set points for the IR cut filter feature shall be configurable through an embedded Web browser.</li><li>▪ The Outdoor Dome camera shall be conformant to the ONVIF Profile S supporting open architecture best practices</li><li>▪ The Outdoor Dome camera shall offer local storage capture of 10-second video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.</li><li>▪ The Outdoor Dome camera shall offer the ability to record continuous video in the case of network outage. It will be accessible through FTP protocol.</li><li>▪ The Outdoor Dome camera shall provide user-selectable configurations for day/night auto mode. Transitional levels shall be used to set the desired light level for transitioning to night mode. Transition detect time shall control the length of time that the camera is exposed to a light level before changing to color or monochrome mode.</li><li>▪ The Outdoor Dome camera shall provide inbuilt simple motion detection to detect motion within a user-defined field of view or within a user specified rectangular zone. Such behaviors shall trigger an alarm.</li><li>▪ The Outdoor Dome camera shall provide inbuilt camera sabotage analytics to detect Tampering, Tripzone, Audio Detection. This is a mandatory requirement and may be supplied through additional analytics software incase it is not present in the camera.</li><li>▪ The Camera should be IP66 rated for outdoor performance</li></ul>
	<ul style="list-style-type: none"><li>• Image Sensor : ½.8” 2 Megapixel progressive CMOS sensor, (1920 x 1080)</li></ul>
	<ul style="list-style-type: none"><li>• Lens : Built-in; Vari-focal, 3.3 ~ 10 mm, DC Drive, Auto Iris</li></ul>
	<ul style="list-style-type: none"><li>• Minimum illumination - 0.03 lux &amp; 0Lux with IR On</li></ul>
	<ul style="list-style-type: none"><li>• Angle of view:(H) 33.5°, (V) 18.6°, (D) 38.3°</li></ul>
	<ul style="list-style-type: none"><li>• WDR - up to 65 db</li><li>• White Balance Range - Auto</li><li>• Digital Noise Reduction - Yes, (ON/OFF selectable)</li><li>• Day &amp; Night Capabilities – Yes (On / Off Selectable)</li><li>• Mechanical IR Cut Filter - Yes, (AUTO/MANUAL selectable)</li><li>• Available language - English</li></ul>
	<ul style="list-style-type: none"><li>• Multiple simultaneous Triple streaming</li></ul>
	<ul style="list-style-type: none"><li>• Available Resolutions : 1920 x 1080, 1280 x 720, 704x480, 352x240</li></ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>• Video Format : H.264 High or Main profiles and MJPEG stream</li> <li>• Frame Rate : 30ips</li> </ul>
	<ul style="list-style-type: none"> <li>• Dual Channel Streaming</li> </ul>
	<ul style="list-style-type: none"> <li>• Line – in / terminal block</li> </ul>
	<ul style="list-style-type: none"> <li>• Audio</li> </ul>
	<ul style="list-style-type: none"> <li>• Network Interface</li> </ul>
	<ul style="list-style-type: none"> <li>• Supported Protocols -</li> <li>• TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNMP, SMTP, UPnP</li> </ul>
	<ul style="list-style-type: none"> <li>• Network Port - RJ-45 for 100Base-TX</li> <li>• Cable Type - Cat5 cable or better for 100Base-TX</li> <li>• Input Power - PoE (IEEE802.3af, Class 2) or 12VDC</li> <li>• Local Storage - Up to 32GB on Micro SDHC or SDXC card</li> </ul>
	<ul style="list-style-type: none"> <li>• Pan/Tilt Adjustment</li> </ul>
	<ul style="list-style-type: none"> <li>• Operating Temperature 0° to 50°C</li> <li>• Operating Humidity Upto 90%</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>• UL, FCC &amp; CE</li> </ul>

**7. 30x Full HD Outdoor Speed Dome PTZ camera: SME 124807**

<b>Functional Specifications</b>	<ul style="list-style-type: none"> <li>▪ The Outdoor High Speed PTZ Dome Camera shall be a discreet camera dome system consisting of a dome drive with a variable speed/high speed pan/tilt drive unit with continuous 360° rotation.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera offer multiple simultaneous video streams with 2.0 megapixel (Mpxl ) 1920 x 1080p resolution, providing 30 images per second (ips), and with auto iris with 30X optical, and 10X digital zoom.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall be conformant to the ONVIF Profile S and support open architecture best practices.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall provide a 100Base-TX network interface.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall support minimum 10 user-programmable presets.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall support user-programmable tours.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall support proportional pan/tilt functions dependent on the depth of view of the zoom lens.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall provide dynamic focus settings to provide on/off options for Auto Focus and two selections for autofocus frequency available through the embedded web browser.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall support IPv4 configurations.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall provide user-selectable configurations for day/night auto mode.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall provide Basic Motion</li> </ul>
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<p>Detection analytic to detect motion within the field of view and trigger an alarm.</p> <ul style="list-style-type: none"> <li>▪ The Outdoor High Speed PTZ Dome Camera shall provide Camera Sabotage analytics to detect Tampering.</li> <li>▪ The Outdoor High Speed PTZ Dome Camera shall be capable of using Power over Ethernet or (PoE+) as a power option with full camera functionality.</li> <li>▪ The PTZ should be IP66 certified</li> <li>• ½.8” CMOS , Resolution – 1920 x 1080</li> </ul>
	<ul style="list-style-type: none"> <li>• Lens : f/1.6 ~ f/4.2 focal length 3.00mm (wide) ~ 129 mm (tele)</li> </ul>
	<ul style="list-style-type: none"> <li>• Colour : 0.05 Lux, B/W 0.015 Lux @F1.6</li> <li>• Day/Night Capabilities Yes</li> <li>• IR Cut Filter Yes</li> <li>• Iris Control Auto iris</li> </ul>
	<ul style="list-style-type: none"> <li>• Images per Second (ips) 30</li> <li>• Optical Zoom 30X</li> <li>• Digital Zoom 10X</li> </ul>
	<ul style="list-style-type: none"> <li>• Angle of View: 65° (wide) ~ 2.3° (tele)</li> </ul>
	<ul style="list-style-type: none"> <li>• Aspect Ratio : 16:9</li> </ul>
	<ul style="list-style-type: none"> <li>• Dynamic Range: : up to 65 db</li> </ul>
	<ul style="list-style-type: none"> <li>• White Balance Range</li> </ul>
	<ul style="list-style-type: none"> <li>• Digital Noise Reduction</li> </ul>
	<ul style="list-style-type: none"> <li>• Signal to Noise Ration: 32dB</li> </ul>
	<ul style="list-style-type: none"> <li>• Automatic Gain Control</li> </ul>
	<ul style="list-style-type: none"> <li>• Day &amp; Night capabilities</li> </ul>
	<ul style="list-style-type: none"> <li>• Infrared-Cut Removable (ICR) Filter</li> </ul>
	<ul style="list-style-type: none"> <li>• Video Encoding - H.264 High, Main, or Base Profiles and MJPEG</li> <li>• Video Streams - Up to3 simultaneous streams, the second stream is variable based on the setup of the primary stream</li> <li>• Frame Rate -Up to 30 IPS minimum</li> <li>• Resolution :</li> <li>• 1920 x 1080</li> </ul>
	<ul style="list-style-type: none"> <li>• Supported Protocols: TCP/IP, RTSP, TCP, HTTP, HTTPS, RTP, UDP, FTP, SMTP, SNTP, DNS, UPnP</li> <li>• Security Access - Password protected</li> <li>• Software Interface - Web browser view and setup</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>• Open API - ONVIF Profile S</li> <li>• Video Motion Detection - Simple motion detection and camera Tampering Alert</li> <li>• Local Storage - Up to 32GB SD</li> </ul>
	<ul style="list-style-type: none"> <li>• Ports - RJ-45 for 100Base-TX; Auto MDI/MDI-X; Auto negotiate/manual setting</li> <li>• Cabling Type - Cat5 cable or better for 100Base-TX</li> <li>• Input Voltage -24 VAC nominal / 12VDC / PoE Alarms</li> <li>• Inputs 1</li> <li>• Output 1; relay (30 V, 1 A)</li> </ul>
	<ul style="list-style-type: none"> <li>• Pan Movement 360° continuous pan rotation</li> <li>• Tilt Movement +1° to -90°</li> <li>• Manual Control Speed Pan speed of 0.02° to 180° per second and a tilt speed of 0.02° to 180° per second</li> <li>• Presets Minimum 10 positions</li> <li>• Tours Yes</li> <li>• Proportional Pan/Tilt Speed Speed decreases in proportion to the increasing depth of zoom</li> <li>• Motor Continuous duty and variable speed, operating at 24 VAC nominal</li> <li>• Auto Flip - Rotates dome 180° at bottom of tilt travel</li> <li>• Power Consumption - 24 VA</li> </ul>
	<ul style="list-style-type: none"> <li>• Operating Temperatures 0° to 50°C</li> <li>• Operating Humidity Up to 90%</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>• UL, CE &amp; FCC</li> </ul>

**8. 2 Mega Pixel Network Box Camera: SME 124808**

<b>Functional Specifications</b>	<ul style="list-style-type: none"> <li>• The Outdoor network box camera shall offer multiple simultaneous video streams with 2 megapixel (Mpxl) 1920 x1080 resolution @30 IPS, auto iris and varifocal lens.</li> <li>• The Outdoor network box camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm.</li> <li>• The Outdoor network box camera shall support H.264 High or Main profiles, or MJPEG.</li> <li>• The Outdoor network box camera shall support configurable frame rates, bit rates for additional bandwidth administration.</li> <li>• The Outdoor network box camera shall be conformant to the ONVIF Profile S</li> <li>• The Outdoor network box camera shall offer local storage capture of 10-second video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.</li> <li>• The Outdoor network box camera shall provide 8-22mm Auto Iris Vari-Focal capabilities</li> </ul>
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>The Outdoor network box camera shall provide simple motion detection to detect motion within a user-defined field of view or within a user specified rectangular zone. Such behaviors shall trigger an alarm.</li> <li>The box camera shall provide inbuilt camera sabotage analytics to detect Tampering, Tripzone, Audio Detection. Incase its not available in the camera then additional analytics software may be provided for the same.</li> </ul>								
	<ul style="list-style-type: none"> <li>1/2.5", 8 Megapixel (1920 X 1080) progressive CMOS sensor</li> </ul>								
	<ul style="list-style-type: none"> <li>Minimum illumination: Down to 0.05 Lux @F1.8</li> <li>8-22mm Auto Iris C-Mount Lens</li> </ul>								
	<ul style="list-style-type: none"> <li>DC drive auto iris lens</li> </ul>								
	<ul style="list-style-type: none"> <li>Wide Dynamic Range – up to 65 dB</li> </ul>								
	<ul style="list-style-type: none"> <li>White Balance Range –Auto</li> </ul>								
	<ul style="list-style-type: none"> <li>Day/Night ICR Cut Filter</li> </ul>								
	<ul style="list-style-type: none"> <li>Multiple simultaneous streams with up to 3 different configurations plus service stream; the second stream is variable based on the setup of the primary stream</li> </ul>								
	<ul style="list-style-type: none"> <li>Available Resolutions 1920 x 1080, 1280 x 720, 704x480, 352x240</li> </ul>								
	<ul style="list-style-type: none"> <li>H.264 High or Main profiles and MJPEG stream</li> </ul>								
	<ul style="list-style-type: none"> <li>Frame Rate: Up to 30,ips</li> </ul>								
	<ul style="list-style-type: none"> <li>Bit Rate Control</li> </ul>								
	<ul style="list-style-type: none"> <li>Supported Protocols - TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNMP, SMTP, UPnP</li> </ul>								
	<table> <tr> <td>Network Port</td><td>RJ-45 for 100Base-TX</td></tr> <tr> <td>Cable Type</td><td>Cat5 cable or better for 100Base-TX</td></tr> <tr> <td>Input Power</td><td>PoE (IEEE802.3af, Class 2); 24 VAC</td></tr> <tr> <td>Local Storage</td><td>Up to 32GB on Micro SDHC /SDXC card</td></tr> </table>	Network Port	RJ-45 for 100Base-TX	Cable Type	Cat5 cable or better for 100Base-TX	Input Power	PoE (IEEE802.3af, Class 2); 24 VAC	Local Storage	Up to 32GB on Micro SDHC /SDXC card
Network Port	RJ-45 for 100Base-TX								
Cable Type	Cat5 cable or better for 100Base-TX								
Input Power	PoE (IEEE802.3af, Class 2); 24 VAC								
Local Storage	Up to 32GB on Micro SDHC /SDXC card								
<b>Certification</b>	<ul style="list-style-type: none"> <li>UL, CE &amp; FCC</li> </ul>								

**9. Outdoor Network Dome Camera**

**SME 124809**

Functional Specifications	
	<ul style="list-style-type: none"> <li>The Outdoor network dome camera shall offer multiple simultaneous video streams with 2 mega pixel (Mpxl) 1920 x 1080 resolution @30 IPS, auto iris and varifocal lens.</li> <li>The Outdoor network dome camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm</li> <li>The Outdoor network dome camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0.4 in color and 0.015 lux in night mode.</li> <li>The Outdoor network dome camera shall support two simultaneous, configurable video streams. H.264 and MJPEG compression formats</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>The Outdoor network dome camera shall support configurable frame rates, bit rates for additional bandwidth administration.</li> <li>The Outdoor network dome camera shall be conformant to the ONVIF Profile S</li> <li>The Outdoor network dome camera shall offer local storage capture of 10-second video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.</li> <li>The Outdoor network dome camera shall provide the ability to backup and restore camera settings through an embedded Web browser. The Outdoor network dome camera shall provide 8-22mm Auto Iris Vary-Focal capabilities</li> <li>The Outdoor network dome camera shall provide simple motion detection to detect motion within a user-defined field of view or within a user specified rectangular zone. Such behaviors shall trigger an alarm.</li> <li>The dome camera shall provide inbuilt camera sabotage analytics to detect Tampering, Trip zone, Audio Detection. In case its not available in the camera then additional analytics software may be provided for the same.</li> <li>The Outdoor network dome camera shall be capable of firmware upgrades through a network using a web user interface or a software-based device utility.</li> </ul>
	<ul style="list-style-type: none"> <li>Minimum illumination: Down to 0.015 Lux @F1.8</li> <li>8-22mm Auto Iris Lens</li> </ul>
	<ul style="list-style-type: none"> <li>DC drive auto iris lens</li> </ul>
	<ul style="list-style-type: none"> <li>Wide Dynamic Range – up to 65 dB</li> </ul>
	<ul style="list-style-type: none"> <li>White Balance Range –Auto</li> </ul>
	<ul style="list-style-type: none"> <li>Varifocal 3.3-10 mm</li> </ul>
	<ul style="list-style-type: none"> <li>Day/Night ICR Cut Filter</li> </ul>
	<ul style="list-style-type: none"> <li>Multiple simultaneous streams with up to 3 different configurations plus service stream; the second stream is variable based on the setup of the primary stream</li> </ul>
	<ul style="list-style-type: none"> <li>Available Resolutions 1920 x 1080, 1280 x 720, 704x480, 352x240</li> </ul>
	<ul style="list-style-type: none"> <li>H.264 High or Main profiles and MJPEG stream</li> </ul>
	<ul style="list-style-type: none"> <li>Frame Rate: Up to 30,ips</li> </ul>
	<ul style="list-style-type: none"> <li>Bit Rate Control</li> </ul>
	<ul style="list-style-type: none"> <li>Supported Protocols - TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNMP, SMTP, UPnP</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	Network Port	RJ-45 for 100Base-TX
	Cable Type	Cat5 cable or better for 100Base-TX
	Input Power	PoE (IEEE802.3af, Class 2); 24 VAC
	Local Storage	Up to 32GB on Micro SDHC/ SDXC card
<b>Certification</b>	<ul style="list-style-type: none"><li>UL, CE &amp; FCC</li></ul>	

**10. 5 Megapixel Fisheye Network Camera:****SME 124810**

<b>Functional Specifications</b>	<ul style="list-style-type: none"><li>The Outdoor network Fisheye camera shall offer multiple simultaneous video streams with 5 megapixel (Mpxl) 2560 x 2048 resolution, auto iris and vari-focal lens with Vandal Proof Body</li><li>The Fisheye camera shall offer quadruple simultaneous video streams<ul style="list-style-type: none"><li>The Fisheye camera shall provide a easy installation with NVR</li><li>The Fisheye camera shall provide various viewing composition</li><li>The Fisheye camera shall provide minimum 6 dewarping view modes</li><li>The Fisheye camera shall provide camera side dewarping</li><li>The Fisheye camera shall support Day Night ICR</li><li>The Fisheye camera shall support micro SD/ SDHC</li><li>The Outdoor network Fisheye camera shall support 2 way audio</li><li>The Outdoor network Fisheye camera shall alarm in / alarm out</li><li>The Outdoor network Fisheye camera shall be Vandal proof / IP66 support</li><li>The Camera should be IP66 Compliant</li><li>The Outdoor network Fisheye camera shall support POE ( IEEE802.3af) class 3, 12VDC</li><li>The Outdoor network Fisheye camera shall be conformant to the ONVIF Profile S supporting open architecture best practices</li></ul></li></ul>
	<ul style="list-style-type: none"><li>1/1.8" CMOS, 5 Megapixel (2560 x 2048) progressive CMOS sensor</li></ul>
	<ul style="list-style-type: none"><li>Minimum illumination:Clr 0.8Lux @ F2.0, B/W 0.003 Lux @ F2.0</li></ul>
	<ul style="list-style-type: none"><li>Wide Dynamic Range – More than 70 dB</li></ul>
	<ul style="list-style-type: none"><li>White Balance Range – Auto</li></ul>
	<ul style="list-style-type: none"><li>Fixed Focal 1.55mm, F2.0</li></ul>
	<ul style="list-style-type: none"><li>Vandal Proof Housing</li></ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>Multiple simultaneous streams with up to 3 different configurations plus service stream; the second stream is variable based on the setup of the primary stream</li> </ul>
	<ul style="list-style-type: none"> <li>Available Resolutions 2560x2048, 1280x1024, 640x512, 2048x1024, 1536x1536, 1024x1024, 1024x512, 512x512</li> </ul>
	<ul style="list-style-type: none"> <li>H.264 High or Main profiles and MJPEG stream</li> </ul>
	<ul style="list-style-type: none"> <li>Frame Rate: Up to 30,ips</li> </ul>
	<ul style="list-style-type: none"> <li>Bit Rate Control</li> </ul>
	<ul style="list-style-type: none"> <li>Supported Protocols - TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNTp, SMTP, UPnP</li> </ul>
	Network Port RJ-45 for 100Base-TX Cable Type Cat5 cable or better for 100Base-TX Input Power PoE (IEEE802.3af, Class 2), or 12VDC Local Storage Up to 32GB on Micro SDHC or SDXC card
	<ul style="list-style-type: none"> <li>Operating Temperature -10° to 50°C (14° to 122°F)</li> <li>Operating Humidity 0 to 90%, RH condensing</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>UL, CE &amp; FCC</li> </ul>

**11. Outdoor Network IR Bullet Camera: SME 124811**

<b>Functional Specifications</b>	<ul style="list-style-type: none"> <li>The Outdoor network Bullet camera shall offer multiple simultaneous video streams with 5 megapixel (Mpxl) 2592 x 1944 resolution @30 IPS, auto iris and varifocal lens. IR Range minimum 25m</li> <li>The Outdoor network Bullet camera shall provide a removable, local storage medium (Micro SD) to capture video clips of varying lengths upon camera sabotage, motion, or relay alarm.</li> <li>The Outdoor network Bullet camera shall provide advanced low-light capabilities for day/night models with sensitivity down to 0.4 in colour and 0.009 lux in night mode.</li> <li>The Outdoor network Bullet camera shall support H.264 High or Main profiles, or MJPEG</li> <li>The Outdoor network Bullet camera shall be conformant to the ONVIF Profile S</li> <li>The Outdoor network Bullet camera shall offer local storage capture of 10-second video clips on camera from alarms created by sabotage, motion detection, or alarm inputs.</li> <li>The Outdoor network Bullet camera shall provide the ability to backup and restore camera settings through an embedded Web browser.</li> <li>The Outdoor network Bullet camera shall provide motorized Varifocal Capabilities</li> </ul>
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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<ul style="list-style-type: none"> <li>▪ The Outdoor network Bullet camera shall provide user-selectable configurations for day/night auto mode.</li> <li>▪ The box camera shall provide inbuilt camera sabotage analytics to detect Tampering, Tripzone, Audio Detection. Incase its not available in the camera then additional analytics software may be provided for the same.</li> </ul>
	<ul style="list-style-type: none"> <li>• 1/2.5", 5 Megapixel (2592 x 1944) progressive CMOS sensor</li> </ul>
	<ul style="list-style-type: none"> <li>• Minimum illumination: Down to 0.01Lux @F1.2</li> <li>• 3.0-9 mm Motorized Zoom Lens</li> </ul>
	<ul style="list-style-type: none"> <li>• DC drive auto iris lens</li> </ul>
	<ul style="list-style-type: none"> <li>• Wide Dynamic Range – Up to 65 dB</li> </ul>
	<ul style="list-style-type: none"> <li>• White Balance Range –Auto</li> </ul>
	<ul style="list-style-type: none"> <li>• Day/Night ICR Cut Filter</li> </ul>
	<ul style="list-style-type: none"> <li>• Multiple simultaneous streams with up to 3 different configurations plus service stream; the second stream is variable based on the setup of the primary stream</li> </ul>
	<ul style="list-style-type: none"> <li>• Available Resolutions 2592 x 1944, 1920 x 1080, 1280 x 720, 704x480, 352x240</li> </ul>
	<ul style="list-style-type: none"> <li>• H.264 High or Main profiles and MJPEG stream</li> </ul>
	<ul style="list-style-type: none"> <li>• Frame Rate: Up to 30,ips</li> </ul>
	<ul style="list-style-type: none"> <li>• Bit Rate Control</li> </ul>
	<ul style="list-style-type: none"> <li>• Supported Protocols - TCP/IP, RTP, RTSP, HTTP, RTP, RTSP, UDP, HTTPS, FTP, SNTp, SMTP, UPnP</li> </ul>
	<ul style="list-style-type: none"> <li>• Network Port RJ-45 for 100Base-TX</li> <li>• Cable Type Cat5 cable or better for 100Base-TX</li> <li>• Input Power PoE (IEEE802.3af, Class 2); 24 VAC</li> <li>• Local Storage Up to 32GB on Micro SDHC or SDXC card</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>• UL, CE &amp; FCC</li> </ul>

**12. Under Vehicle Surveillance System with integrated ANPR: SME 124812**

<b>Functional Specifications</b>	<ul style="list-style-type: none"> <li>• The UVSS should be able to capture a very high resolution and complete composite under body image of any vehicle passing over it using a single high resolution Area - Scan GigE IP Camera without requiring the vehicle to stop.</li> <li>• The UVSS should be able to handle vehicles moving at different speeds ranging from 0-20 km/hr while the composite image captured by the system should be automatically and dynamically adjusted according to the speed of the vehicle.</li> <li>• The composite imaging camera should be a high quality, Color Area Scan, GigE type, with minimum XGA resolution of 1024x768 or above . The minimum specification of this area-scan camera shall be:</li> <li>• Camera type: Gigabit Ethernet Progressive Area-Scan Color Camera.</li> </ul>
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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<ul style="list-style-type: none"><li>• Sensor: 1/3" CCD.</li><li>• Horizontal/Vertical Resolution 1294x964 Pixels</li><li>• Frame rate : 30 fps at full resolution.</li><li>• Camera Certification CE, FCC, IP30.</li><li>• Suitable Camera Casing.</li><li>• The UVSS should be capable of producing a clear and undistorted image of the vehicle's underside, even when a vehicle has completely stopped over the UVSS unit, i.e. it must be able to create a seamless and perfect composite image of the underside irrespective of the vehicle stopping or moving in a non-uniform manner over the scanner.</li><li>• The UVSS must have a feature to magnify the composite images (current and past), in order to facilitate a closer view of any part of the composite image.</li><li>• The underside illumination must be adequate and obtained through any state-of-the-art, long-life LED lighting modules. It should not use Halogen or CFL-type lighting elements for illumination of the underside</li><li>• The UVSS should be able to dynamically and automatically adjust the brightness and contrast of the composite image, so as to ensure good quality images, irrespective of the different external lighting conditions.</li><li>• The UVSS should also provide a feature to capture the image of the driver, captured through a suitable driver view camera.</li><li>• The UVSS should give a real-time output of all the data simultaneously, i.e. the composite image, driver photos, vehicle front image and license Plate display (if applicable) and all should be displayed on the monitor almost instantaneously.</li><li>• The UVSS must have a built-in software diagnostics capability, to facilitate any distant software support to be offered offline.</li><li>• The UVSS applications and operating software should be based on windows platform it must have a user friendly GUI with provision for multiple users logging of events and search facility.</li><li>• The UVSS system must have a facility for backup of all transactions to any usual backup/storage media and also should be able to print out reports.</li><li>• The UVSS underground camera should be enclosed in a suitable all-weather-proof housing of IP67 equivalent or higher standard.</li><li>• The Operating System should be latest version of MS Windows.</li><li>• The overall Installed unit should be properly designed, and its structure should be able to withstand a total vehicle load of up to 40 tons at any given point over the structure, more particularly at the center of the unit, so as not to suffer any accidental physical damage to the unit and components under the pit cover. A suitable pit Ventilation system should be provided to cool the UVSS during the high temperatures.</li><li>• The front end of the software should be designed on Microsoft .NET technology.</li><li>• The back end database should be on SQL Server.</li><li>• The UVSS should have open protocol for integration with other security systems and also networking for any remote monitoring requirements.</li><li>• The end of the day report should export the driver and the number plate image directly to a Microsoft Excel sheet for future use or reference.</li><li>• The UVSS should also provide a feature to capture the image of the driver for all RHS driven vehicles, captured through a suitable driver view camera.</li><li>• The UVSS must have a feature to magnify the composite images (current and past), so as to facilitate a closer and zoom-up view of it.</li><li>• The UVSS shall have an integrated video management system to record the driver and lpr camera streams</li><li>• The UVSS software shall have image enhancement features like negative, edge map etc.</li><li>• The UVSS software shall be able to monitor and operate multiple uvss systems installed at different gates. Vehicle search result shall be able to fetch results from all the gates</li></ul>
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>The UVSS should be embedded type, the humped type shall not be acceptable.</li> <li>Minimum Specifications of Driver Image Camera:</li> </ul>
	<ul style="list-style-type: none"> <li>a) Sensor type shall be CCD/CMOS</li> </ul>
	<ul style="list-style-type: none"> <li>b) Pixel rate : 2.0 MP</li> </ul>
	<ul style="list-style-type: none"> <li>c) Video format shall be NTSC/PAL</li> </ul>
	<ul style="list-style-type: none"> <li>d) Power supply : 12 V DC</li> </ul>
	<ul style="list-style-type: none"> <li>e) Camera and light enclosure shall be Minimum IP 66 rated &amp; UL Listed.</li> </ul>
	<p>The Processing Unit should have:</p> <ul style="list-style-type: none"> <li>a) 8 GB RAM</li> <li>b) 2 TB HDD</li> <li>c) Latest Intel Core i7 processor.</li> <li>d) 22" Display Monitor, Keyboard, Mouse</li> <li>e) Software for full functioning of the system.</li> </ul>
	Sensor Unit shall have Inductive loop sensor/IR Sensors. Sensor Unit shall have Inductive loop sensor/IR Sensors.
	<ul style="list-style-type: none"> <li>Suitable Lighting Unit should be LED 220 V AC. Suitable Lighting Unit should be LED 220 V AC. Operating temperature: -10°C to + 55°C</li> </ul>
	<ul style="list-style-type: none"> <li>Operating temperature: -10°C to + 55°C</li> </ul>
	<ul style="list-style-type: none"> <li>IP 66 or better.</li> </ul>
	<ul style="list-style-type: none"> <li>Specifications for Automated License Plate Recognition System (ALPRS):</li> </ul>
	<ul style="list-style-type: none"> <li>The System should automatically detect a four wheeler approaching the installed location by means of inductive loops.</li> </ul>
	<ul style="list-style-type: none"> <li>On detection of vehicle approach, the system would activate the license plate video capture cameras.</li> <li>The system shall automatically detect the license plate in the captured video feed in real-time.</li> <li>The system shall perform OCR (Optical Character Recognition) of the license plate characters (English alpha-numeric characters in standard fonts).</li> <li>The system shall store JPEG image of vehicle and license plate and enter the license plate number into SQL Server or any other user specified database along with date, timestamp and site location details.</li> <li>System should be able to detect and recognize the English alpha numeric License plate in all standard fronts and formats of all four wheelers including cars, HCV, LCV.</li> <li>The system processing should be real time i.e. Instant the recognition of license number plates.</li> <li>The system should be able to process and read number plates of vehicles with speed even up to 60 km/hr.</li> <li>The system should store video clip of the vehicle approaching and leaving the location.</li> <li>The system should have option to input certain license plates according to category like "Wanted", "Suspicious", "Stolen", "Expired", etc by authorized personnel. On successful recognition of the number plate, system should be able to generate automatic alarm to alert the control room for vehicles which have been marked as "Wanted", "Suspicious", "Stolen", "Expired". System should have provision/expansion option to add more categories for future need.</li> <li>System shall have option to be integrated with other access control hardware/software on site.</li> <li>The system shall enable easy and quick retrieval of snapshots, video and other data for post incident analysis and investigations.</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<ul style="list-style-type: none"><li>• The System should be able to generate suitable MIS reports that will provide meaningful data to concerned authorities and facilitate optimum utilization of resources. These reports shall include:</li><li>• Report of vehicle flow at each of the installed locations for Last Day, last week and last month.</li><li>• Report of vehicles in the detected categories at each of the Installed locations for Last Day, Last week and last month.</li><li>• Report of Vehicle status change in different Vehicle Categories</li><li>• The system shall have option to save custom reports for subsequent use.</li><li>• The system shall have option to export report being viewed to common format for use outside of the ALPRS or exporting into other systems.</li><li>• The system should provide advanced and smart searching facility of license plates from the database. There should be an option of searching number plates almost matching with the specific number entered (up to 1 and 2 character distance).</li><li>• The system should have option to add new category by authorized personnel.</li><li>• The system should have option to update vehicle status in specific category by authorized personnel e.g.. On retrieval of stolen vehicle, system entry should be changed from "Stolen" to "Retrieved".</li><li>• System should provide an option for advanced users to tune the system parameters.</li><li>• System should have option to configure site locations and data management settings.</li><li>• The Central Management Module shall run on the ALPRS Central Server in control room.</li><li>• The system should work in both day and night conditions with good accuracy.</li><li>• The UVSS System supplied should be a complete system which should include the UVSS camera, ANPR Camera as per above specification, driver capture camera and all related individual licenses.</li><li>• The UVSS system should be seamlessly integrated to the VMS software and should have common interface software.</li></ul>
	<ul style="list-style-type: none"><li>• The Camera hardware specification for the ALPRS should be a minimum of below:</li></ul>
<b>Camera Interface</b>	IP
Resolution	2.0Mpxl
Shutter Speed	1/50 – to 1/10000 or better
Operating Temperature	0 deg c to +45 deg c
Frame Rate	25/30 fps
Varifocal Lens	2.8 - 22mm
Electronic Iris Control	DC Type
Mount	C/CS
Image Format	¼, 1/3, ½
Wavelength	850nm ( Semi Covert )
IR Illuminator	Up to 50 meters
Environment Protection	IP65/IP66
Filter	IR Filter
Camera Housing Protection	IP65/IP66
Speed Limit	40Km/Hr
Installation & Mounting	Pole Mounted
Integration	Should be capable of integration with overall architecture of Surveillance

**Network Video Recorder, Monitoring Software & Storage**



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**13 . 32 Channels, Network Video Recorder with 24TB HDD -****SME 124813**

<b>Functional Specifications</b>	<p><b>A.</b> Total Incoming Throughput should be minimum 300 Mbps</p> <p><b>B.</b> Upto 960ips Full HD real time recording</p> <p><b>C.</b> Upto 960ips Live Display</p> <p><b>D.</b> Should be able to cascade over Network ( VMS Software )</p> <p><b>E.</b> Easy to install, setup</p> <p><b>F.</b> Inbuilt 16ch POE ports</p> <p><b>G.</b> Built in 8ch Poe Switch</p> <p><b>H.</b> Expandable upto 80TB using esata Storage.</p> <p><b>I.</b> Should be supplied with 24TB inbuilt HDD Capacity</p> <p><b>J.</b> Support 1 click network configuration</p> <p><b>K.</b> Support third party cameras over ONVIF-S</p>
	<p><b>System Specifications</b></p> <ul style="list-style-type: none"> <li>• Video Input 32 IP Cameras</li> <li>• Incoming Throughput 300 Mbps</li> <li>• Support Cameras ONVIF -S</li> <li>• Video Outputs 1 Hdmi, 1 VGA Out</li> <li>• Screen Resolution 1920x1200,1920x1080,1680x1050,1600x1200</li> <li>• Display Speed Upto 960 IPS</li> <li>• Digital Zoom x2 - x12</li> </ul>
<b>Video Specifications</b>	<ul style="list-style-type: none"> <li>• Max Throughput 300 Mbps, 960 IPS @ Full HD</li> <li>• Recording Resolution Upto 8 Mpxl</li> <li>• Compression H.264</li> <li>• Recording Modes Time Lapse, Event, Pre-Event, Panic</li> <li>• Trigger Events Alarm In, Audio Detection, Motion Detection, Tripzone Tampering, Video Loss</li> </ul> <ul style="list-style-type: none"> <li>• Performance 4Ch Full HD synchronous Playback</li> <li>• Search Mode Time Lapse, Event Log, Motion</li> <li>• Digital Zoom x2 – x12</li> <li>• HDD SATA x6, eSata x4 ( Upto 4TB capacity for each disk</li> <li>• RAID RAID 1 Support</li> <li>• Total Capacity 75 TB or more ( 6 HDD Bays Internal )</li> <li>• Usb 2.0 x 2</li> <li>• User interface Front Buttons, Mouse, IR Remote Control, Network Remote Keyboard.</li> </ul> <ul style="list-style-type: none"> <li>• Environmental Specifications :</li> <li>• Operating Temperature 0° to 40°C</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<ul style="list-style-type: none"> <li>Operating Humidity 0% to 90%</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>CE</li> <li>FCC</li> <li>UL</li> </ul>

**14. . Video Management Software :**

**SME 124814**

<b>Functional Specifications</b>	<ul style="list-style-type: none"> <li>The IP video management system software shall consist of base software with individual, non-expiring licenses in the required quantity.</li> <li>The IP video management system software updates shall be downloadable from a publicly available website.</li> <li>The IP video management system shall support recording of JPEG, MPEG-4 and H.264 IP streams.</li> <li>The IP video management system shall also support third-party H.264 Megapixel video streams up to 10 Megapixel resolution</li> <li>The IP video management system shall have a fully open architecture with support for both IP-specific camera as well as cameras with ONVIF compliance.</li> <li>The IP video management system shall support automatic detection of IP cameras. Third-party IP cameras shall be automatically detected dependent on IP driver versions and manufacturers specifications.</li> <li>The IP video management system shall support an unlimited number of systems connected over a network. Each system shall contain two 1GB network ports; one for IP camera/encoder data, and one to connect to a network for client computer access.</li> <li>The IP video management system shall be viewed, managed, and played back through a single user interface simultaneously with client software</li> <li>The IP video management system shall remote surveillance of live video and remote playback of video recordings</li> <li>The IP video management system shall support real time notifications of detected events and remote monitoring of event videos.</li> <li>The IP video management system shall start panic recording of live videos and playback of panic recordings.</li> <li>The IP video management system shall support registration of upto 1024 devices.</li> <li>The IP video management system shall allow simultaneous remote software upgrades and multi play system setup.</li> <li>The IP video management system shall be capable of continuous scheduled alarm/event and motion recording. Pre- and post- alarm recording shall also be available and shall be fully programmable on a per channel basis.</li> <li>The IP video management system shall allow archival of video data to computers or SAN storage devices over a network connection with the optional Archive Utility. The</li> </ul>
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<p>archival schedule shall be either automatic at user-defined intervals or manual and shall be configurable per connected camera.</p> <ul style="list-style-type: none"> <li>▪ The IP video management system shall display device system logs</li> <li>▪ The IP video management system shall monitor live emaps</li> <li>▪ The IP video management system shall support SSL for security</li> <li>▪ The IP video management system shall support authority settings by user groups for security.</li> <li>▪ The IP video management system shall support intuitive and user friendly GUI</li> <li>▪ Support SD Card Playback</li> <li>▪ The IP video management system shall support5 all live viewing, searches, emaps, and condition monitoring can be executed simultaneously by supporting multi docking of screens.</li> <li>• Should support the following Video Analytics: Audio Detection, Tampering and Trip zone per channel. as standard supply.</li> </ul>
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**15. Storage System with 16 TB HDD StorageSME 124815**

Hardware Features	<ul style="list-style-type: none"> <li>• Rack Mount Type</li> <li>• Supports RAID Levels 0,1+5</li> <li>• Support minimum 4 HARD DRIVE Bay X 1 Bays: 3.5" Internal, SATA II – Up to 4 TB capacity for each disk.</li> <li>• Maximum of 3.0G Gbps transfer rate ( SATA II)</li> <li>• Easy expandability to large storage pool</li> <li>• Should be supplied with 16 TB Internal HDD</li> <li>• Connectivity through 1Giga Lan Port or eSATA</li> </ul>
	<ul style="list-style-type: none"> <li>• Seamless connectivity to Network Video Recorder and Video Management System</li> </ul>
	<ul style="list-style-type: none"> <li>• External Power Supply 100-240VAC</li> </ul>
	<ul style="list-style-type: none"> <li>• CE, FCC</li> </ul>

**16. Storage System with 64 TB HDD Storage**

**SME 124816**

Hardware	<b>i.</b> Rack Mount Type
	<b>ii.</b> Supports RAID Levels 0,1+5
	<b>iii.</b> Support minimum 4 HARD DRIVE x 4 Bay : 3.5" Internal, SATA II – Up to 4 TB capacity for each disk.
	<b>iv.</b> Maximum of 3.0G Gbps transfer rate ( SATA II)
	<b>v.</b> Easy expandability to large storage pool
	<b>vi.</b> Should be supplied with 64TB Internal HDD

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<b>vii.</b>	Connectivity through 1Giga Lan Port or eSATA
	<b>viii.</b>	Seamless connectivity to Network Video Recorder and Video Management System
	<b>ix.</b>	External Power Supply 100-240VAC
	<b>x.</b>	CE, FCC

**17. Video Management and Analytics Software: Enterprise Version SME 124817**

<b>Video Management and Analytics Software</b>
<b>Technical Specifications</b>
<b>I. Architecture</b>
The video management system (VMS) specified should be a centrally managed, Fully Distributed, scalable client/server based architecture designed for limitless cameras.
The contractor is to provide and install a live and recorded video management and NVR solution for real time event monitoring and real time event analysis. It must be capable of integration with Video Content Analysis software, IP cameras, Analogue Cameras, PTZ cameras, Dome Cameras and video encoders. The Video Management solution must be able to show live and recorded video in the same window simultaneously and enable triggered pull up of customized layouts & video streams & maps & Pan Tilt Zoom presets according to Analytic and dry contact related events. The proposed solution shall meet all requirements specified in this Section.
Scalability: The VMS shall have ability to connect and integrate other technologies and third party software systems (e.g. ANPR, UVSS, Analytics, Facial Recognition etc.) and act as a cohesive platform for entire surveillance and security system. The system should be able to bi-directionally and dynamically exchange data between various software applications in real-time as well as schedule transfer. The Software shall be scalable upto 10 times minimum. Support for unlimited cameras, servers, sites and clients. Support for storage expandability.
The Video Management System (VMS) must be able to display video stream and alerts from Third Party H/W units and Alerts from Third Party S/W Intelligence System.
The contractor is to provide and install a live and recorded video management and NVR solution for real time event monitoring and real time event analysis. It must be capable of integration with Video Content Analysis software, IP cameras, Analogue Cameras, PTZ cameras, Dome Cameras and video encoders. The Video Management solution must be able to show live and recorded video in the same window simultaneously and enable triggered pull up of customized layouts & video streams & maps & Pan Tilt Zoom presets according to Analytic and dry contact related events. The proposed solution shall meet all requirements specified in this Section.
The VMS will be based on the windows based server – client architecture, where the video & audio streams and the triggers from the devices connect directly to the recording servers and the system server is responsible to manage the distribution of information from the recording servers to the clients according to client's requests and permissions.
<b>Devices Support</b>
The proposed VMS should support multi-brand cameras and should be camera hardware Vendor-neutral solution
Input and output support: The VMS shall have ability to receive and accumulate inputs from external hardware/software and respond and activate outputs based on the predefined rules.
Event management: The VMS shall have ability to enforce custom settings for event detection, alarm notification, recording, input/out (I/O) control, and other features in response to events. The alarm management module shall support graphical displays with interactive icons to display the status of the cameras & other inputs.
Support for standard protocols: The VMS shall have ability to maintain independence from any one vendor & shall support open standard protocol i.e. ONVIF or RTSP
Should support limitless multi-brand cameras from day one

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**VMS Description**

**The VMS shall be a software product that is Microsoft Windows-compatible and shall provide the following capabilities:**

Designed to serve as an video management and network video recorder solution for managing endless number of live and recorded video streams by a large number of clients, the VMS should be integrated with many vendors of video servers, IP cameras, Analog cameras and Video Content Analytic providers.

Provide endless number of layout and PTZ presets (according to H/W limitations)

Provide Server multi-unicast for non-multicast networks.

Provide virtual and Joystick control of PTZ cameras.

Provide multi screens and video wall support to enable monitoring.

Presents live video embedded in site's maps that is resolution and frame rate sensitive to the zoom level, with up to 10 map presets.

Provide intuitive zooming capabilities in the maps – pointing the mouse cursor and scrolling.

Enable virtual linkage of many to many video cameras in the system to allow constant follow up after a moving object in the site through the live video windows in the operator screen.

Support net secured architecture – system architecture allow many far away clients to connect through one standard port in the firewall.

The VMS Runs on computer networks using industry-standard equipment.

Allows connectivity to many third party systems e.g. fence systems, burglar alarm or fire detection systems. The VMS provides a virtual I/O device to connect any third party system that can send or receive data according to the supplied VMS protocol.

**Operational Environment**

The VMS shall have the capability of operating in an environment that requires multi-tasking, when using multiple cameras and devices spread over a wide area.; input one or more alerts based on user-defined criteria, device and related video stream; determine preferential escalation implementations and responses allowing layout & map & video channel & PTZ preset & output activations accordingly; and immediately assess response actions for viability such as start recording multiple video channels, send an email with snapshot or clip of a specific channel. The VMS shall include network-capable web services and multi system control center for monitoring many independent sites simultaneously which shall be programmed and monitored by any permitted VMS client running on a workstation. The VMS SW Installer shall be provided to the customer from the manufacturer's web-site. The installer shall also include all documentation and manuals as well as On-Line Help for each application. Version updates shall not affect the system setting and can be performed from any workstation, for all applications. The Installation documentation is downloaded as separate files enabling the end-user to use them during the installation process.

The VMS should have seamless integration with ANPR and UVSS from the beginning.

**VMS Performance and Operational Requirements**

**Video Standards and Formats**

VMS shall support Server multi-unicast for non-multicast networks.

VMS shall have the capability of accepting analog (NTSC and PAL) video signals and a range of digital video compression video stream including M-JPEG, MPEG-2, MPEG-4, H.263, and H.264.

Each VMS recording server shall manage up to 64 video channels

VMS shall have bandwidth managed from 9.6Kbps – 8Mbps per channel

Each VMS system server shall manage up to 512 recording servers.

VMS shall have the capability of providing video processing for CIF resolution (320x240 for NTSC, 352x288 for PAL) at up to 30 FPS, with the capability for high resolutions, including 4CIF resolution at up to 30 FPS, when suitable hardware is made available. If required, mega-pixel and high-definition (HD) cameras can be connected to the system on request.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**Recording & Playback**

VMS shall support Manual recording in the client work stations of every channel, continues recording, event recordings according to any event input in the system and scheduled recording by predefined user timing.

VMS shall support multi drives management.

VMS shall enable Instant playback from the live video window of up to 10mn before the current time.

VMS shall support up to 16 channel playback and live video simultaneously, synchronized or not synchronized, in the live video window. Each channel playback time and speed can controlled separately.

Playback speed shall have the following levels: Normal, X2, X4, X8, X16, reverse, frame by frame playback

Video recording search shall be defined by either channel or/and time and date or/and VMD

VMS shall support standard Microsoft storage technology for archiving.

VMS shall support remote storage in order to secure the archived data and for storage scalability.

VMS shall support local storage for bandwidth utilization

VMS shall support Audio recordings simultaneously to the video recordings.

**Logging and Reporting:**

VMS shall include full Settings Data base backup for fast recovery.

VMS shall support System log of integral self diagnostic alarm and event.

VMS shall enable reports of Log audit trail of user login, logout and archiving functions integral reporting application with advanced sorting filters.

**User Management:**

User database with login, password and contact details

User profiles with configurable permissions and access settings.

**Integrations:**

Integration with many PTZ protocols, virtual or joystick control of all PTZ cameras

**Display:**

VMS shall support virtual matrix based on standard PC for video wall display.

VMS shall support drag and drop functionality from and to the operator main screen, video wall and maps.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

VMS shall support endless user configurable split screen modes (presets) including matrix layouts, video channels, with pre-configured connections.

The VMS shall support unlimited number of Display presets for system and custom split screens with assigned channels that will be Configurator by the Operator and kept in the system database upon logout.

The VMS shall support endless number of predefined configurable customized display layouts that can include: live and recorded video, PTZ controllers, unlimited range of user imported icons to be related to any trigger in the system, background image, output controllers and input icons, camera icons and camera players.

VMS include User configurable live maps with embedded video in the maps, the video shall be revealed with frame rate and resolution escalation according to the map zoom level. Map configuration shall be by drag and drop tool in the administrator tool. VMS shall support dedicated screen for the maps.

VMS shall support multi monitor support extending the work station up to 4 screens on the same PC.

**Export:**

VMS shall support video export to AVI format – to be played with any Windows Media Player, with no software installation as a prerequisite.

VMS shall support video export to Native format – original recorded stream to be played with a standalone player application with no software installation as a prerequisite

**Alarm Management:**

VMS shall support incoming alerts as an XML files from the VIS system and enable association of the alerts with predefined video channels, layouts, maps or other devices in the system.

VMS's Alert console shall be constantly displayed in the operator's screen

VMS shall display all the alerts in real time by the related device in the operator alerts management.

VMS shall support Configurable triggers from any device in the system or from 3<sup>rd</sup> party systems through a gateway API.

VMS shall allow downloading an event log file according do defined time.

VMS shall support User definable scheduled alarm rule management.

VMS shall enable post event actions including display of pre and post alarm video in the same screen.

VMS shall provide dedicated alarm spot monitor– the alarm monitor will either allow sequence of the last player or

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

automatic extension of the display layout i.e. 1>4>9>16 to be defined by the system administrator.

**Existing and Future Cameras**

The VMS shall be scalable and able to be configured to manage and control numerous additional existing analog or digital PTZ and fixed cameras at a future time.

The VMS shall support PTZ control overlay on the player of the PTZ cameras that will be managed intuitively with the system mouse. The PTZ control overlay will have an ON/OFF button each player.

The PTZ Control overlay shall allow moving the PTZ camera from anywhere on the player by a simple click and drag of the mouse.

The Zoom of the camera will be done by a simple role of the mouse roller in the camera player

The VMS shall provide PTZ camera lock according to the user's authorization level that should range from 1 – 255 levels, the camera lock would be turned off either by a higher ranked user or by a predefined scenario

**Event Response, Notification and Messaging**

The VMS software shall have the capability to provide automatic and immediate notification of end user-defined triggers. Notifications are transmitted over the user's local area network (LAN), wide area network (WAN) or cellular network as an email message attached with the relevant JPEG or video clip or SMS sent between the system server and the central designated users.

The VMS shall provide the option to activate external Digital Output when an Event has occurred.

**Configuration, Setup and Video Management**

The VMS shall have the capability of being controlled by a graphical user interface (GUI) for the user and the administrator/installer.

The Administrator/Installer GUI shall allow easy deployment of the system, adding devices and assigning permissions per user account.

The end-user shall have the capability of performing all management and monitoring functions from any computer connected to the network.

The VMS shall provide measures for securing operational access to and administrative permissions for endless user permissions:

Resource grouping – each group contains access to various resources in the system such as cameras, inputs, outputs.



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Layouts, video walls and maps.

Profiles – Administrator assigns resource groups per profile e.g. operator, guard, manager. Each profile is assigned with access authority to the specific group that allows control levels of operations allowed per assigned resource in that specific group:

1. View only- the user will only be able to view the live video of each channel in the specific group.

2. Playback – the user will be able to view live and recorded video of each channel, and extract data from the archived storage.

3. PTZ – the user will be able to view live video and control the PTZ cameras.

4. Web client – the users will be able to view all of the groups assigned to the profile via a web client.

5. Configuration – the users in the profile will have full administrator rights.

**Users** – each user is assigned a profile.

#### **Scalability**

The VMS shall be a server-client based system.

The user shall be able to scale the system to support an additional unlimited number of cameras by adding additional recording servers to the network. This procedure does not require any system down time.

#### **General Analytics Requirement**

The requirements listed in this section apply to real-time detection, video search and business intelligence capabilities, unless stated otherwise.

The contractor shall supply a server-client based solution that distributes the processing of the video image between firmware embedded in IP cameras and video encoders, and a server so that a server featuring a six-core processor shall be capable of performing analytics on at least 32 cameras simultaneously.

The system shall support processing video from specific Common Off the Shelf (COTS) IP cameras and video encoders.

Analysis of video shall be performed over a distributed architecture, separating processing video from analysis of data between the edge device and a central server.

Video shall be pre-processed at the edge or server.

Server: Data received from the device shall be received and analyzed based on the rules configured by the user for real-time detection, or by settings automatically configured by the solution for video search & analysis.

In addition to video analysis, the solution shall provide an option to support IP cameras and encoders. This architecture option shall utilize a proxy mechanism that pulls the video stream from a 3<sup>rd</sup> party Video Management System (VMS) and performs the feature extraction on the server side.

The solution shall be easily scalable: the customer shall be able to add servers to the network to enable analytics on an unlimited number of additional cameras (without downtime).

The solution shall support full server redundancy, i.e., automatic switchover to backup components if the primary components fail. The capability is available in deployments of both the embedded feature extractor and the proxy feature extractor.

#### **Bandwidth Consumption**

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

The solution shall transmit extracted feature data with an average of 150 Kbps or less between the camera and the server.

**Hardware & Software**

The solution shall run on computer networks using industry-standard equipment.

The analytics software shall be compatible with COTS equipment and common operating systems, in particular, Windows Server 2008 R2 (64-bit), Windows Server 2012 (64-bit) and Windows 7 (64-bit).

The system shall have the ability to traverse both LAN and WAN network topologies.

The solution shall use an industry standard database such as Microsoft SQL 2008 and Microsoft SQL 2012 for indexing alerts and storing configuration data.

The solution shall be capable of delivering analytics to large-scale deployments comprising thousands of video cameras.

The solution shall be capable of detecting objects whose height is at least 5% of the Field of View (FOV).

The system shall function in diverse environments such as low light, rain, snow and clouds without loss of performance or significant increase in false real-time detection or false search results.

The system should automatically mask different types of repetitive movements that may otherwise cause false alerts.

The system should further allow the operator to specify mask areas within or outside the detection area in which any activity should be ignored, for reducing false alerts. Further, the operator should be able to define mask areas such that if movement of objects of certain sizes is detected, then other selected analytics rules configured on this camera would be deactivated to avoid false alerts.

**Video Devices**

The solution shall be capable of analyzing video streams originating from IP video surveillance cameras including: fixed color / B&W cameras; dome cameras; thermal and infrared cameras.

The solution shall be capable of analyzing digital, compressed video originating from analog video surveillance cameras that are connected via video servers / encoders.

The solution shall enable video analytics on IP cameras and video encoders deploying an embedded feature extractor, from at least five different manufacturers.

For selected PTZ cameras that deploy an embedded feature extractor the solution shall enable real-time detection and alerts on PTZ presets as well as auto-tracking using the camera's PTZ capabilities.

**Analytical Rules for Detection**

The solution shall offer a suite of analytics rules to provide automatic detection of a range of motion and non-motion behaviors of persons, objects and vehicles:

Person moving in area (alerts to movement of a person in a sterile zone)

Person crossing a line (alerts to a person crossing a virtual line / wrong direction of movement)

Crowding (alerts if crowd size reaches a user-defined threshold for a user-defined length of time)

Person tailgating (alerts if a second person crosses a line within a user-defined time after the first person)

Loitering (alerts to persons sojourning for an operator-defined length of time and behaving in away that warrants belief that their purpose is to carry out an illegal activity such as vandalism or theft)

Occupancy (alerts if the number of people in a detection region exceeds a user-defined threshold)

Suspicious object (alerts if an object is added to a scene, meets the operator-defined size, and stays for longer than the operator-defined time)

Asset protection (alerts if a specific object is removed from an operator-defined region for longer than a defined time) Detect lighting (alert if a light source, such as traffic light, is turned on for longer than a predefined time)

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Vehicle moving in area (alerts to vehicle movement)
Vehicle crossing a line (alerts to a vehicle crossing a virtual line / wrong direction of movement)
Stopped vehicle (monitors 'No stopping zones')
Traffic congestion (alert is average vehicles speed is lower than a specified threshold for longer than predefined period)
The solution shall be capable of detecting tampering and video quality in cases of video loss, camera obscuring, camera moving, light saturation, low light and TCP/IP communication problems.
<b>Event Generation</b>
The solution shall provide real-time generation of events to alert operators to irregularities.
The solution shall support simultaneous tracking of an unlimited number of targets within the detection regions and/or the cross lines.
The solution shall enable event on non-detection, i.e., for an alarm to be generated when a rule does not perform detection within a predefined period of time.
<b>Video Search &amp; Analysis Capabilities</b>
The solution shall allow filtering based on target characteristics:
Vehicle size. The solution shall provide predefined presets for Small, Medium, Large and Any vehicle
Object size. The solution shall provide predefined presets for Small, Medium, Large and Any object
Target color. The solution shall provide a predefined palette of colors to choose from. It shall be possible to specify up to two colors to be matched. The solution shall enable searching for targets that match the specified color(s) or targets that don't match the specified color(s).
Event Thumbnails: After searching cameras, the solution shall be capable of displaying Thumbnail results, each of which shows a found person, vehicle or object behavior. It shall be possible to play back the video of each thumbnail. The solution shall be capable of zooming into the original video source so that users shall be able to optimally view tracked targets within the displayed thumbnail. The thumbnail will be extracted from either the integrated VMS or from the video clip, depending on the deployment.
Target Path / Location: After searching, the solution shall be capable of displaying all motion paths in a scene over the field of view reference image. For non-motion behaviors (such as suspicious object and stopped vehicle), the solution shall present the bounding rectangle in the location that the target was found. It shall be possible to immediately play back the video of each target path or target location.
Heat Map: After searching, the solution shall be capable of displaying results in a view that uses color coding to represent relative activity in different areas of the field of view, Highlighting areas in which targets sojourned longest.
Video Summary: After searching, the solution shall be capable of displaying multiple search results in a single condensed, segmented clip. It shall be possible to easily navigate from one video segment to another as well as to directly navigate to any position in the condensed clip.
The solution shall be capable of handling concurrent GUI clients that access the solution and perform video search & analysis.
<b>Minimum Hardware for NMS/Management/Recording Server:</b>
Processor – Intel ® Xeon Processor E3-1220 v3(@3.10Ghz/4-core/8MB/80W) or better specification as per CPU benchmarking
Chipset - Intel ® C222 chipset
Memory – Minimum 16 GB scalable to 32 GB

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

OS- Windows Server 64 bit OS
Hard disks (for OS/live database) – 300GB x 3 on RAID 5 SAS drives at 15000 rpm
Network Card – Min 2 x 1 GB RJ45 and 2 x 10 Gbit/s SFP+ network cards with separate segment for cameras and viewing station
The server OEM should be listed in the top 5 in latest IDC report.
1 x Full HD Display Port and 1 x HDMI Port
<b>Minimum Hardware for workstations:</b>
Processor – Intel® Xeon ® Processor E3-1220 v3 (3.10GHz/4 core/8 MB/80W) Processor
Memory – Minimum 8 GB
Hard disks – 2 X 500GB SATA at 7200 rpms
OS- Windows/RHEL
Network Card – 2 x 1 Gbit/s network card
AGP or PCI-Express, minimum 1920x1080 graphic(s) w/ 4GB Video RAM recommended with DP/HDMI Port.
Monitor with FULL HD Support with HDMI/DP Port, Keyboard & Mouse

**18. 10/100 Single Mode Media Converter SME 124818**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Physical Interface:	<ul style="list-style-type: none"> <li>It shall support media conversion between 10/100BASE-TX and 10/100BASE-FX</li> <li>It shall support auto negotiation of duplex mode on twisted-pair port</li> <li>It shall support auto MDI/MDIX for twisted-pair port</li> </ul>
2	Distance	<ul style="list-style-type: none"> <li>It shall support Maximum fiber cable distance is 30 Km.</li> </ul>
3	Features	<ul style="list-style-type: none"> <li>It shall support modified Cut-through frame forwarding packet forwarding system.</li> <li>It shall support link fault pass through function (LFP)</li> <li>It shall support far end fault function</li> <li>Compliance Features: FCC, IP 30 rating, Safety UL 508, cUL, CE EN60950-1 (LVD) Class I, Division 2, Groups A, B, C, Hazardous Locations Stability IEC60068-2-32 (Free fall) IEC60068-2-27 (Shock) IEC60068-2-6 (Vibration)</li> </ul>
4	Wavelength	<ul style="list-style-type: none"> <li>It shall support wavelength 1310nm</li> </ul>
5	Temperature	<ul style="list-style-type: none"> <li>Operating Temperature: 0 – 50 Deg C</li> </ul>
7	Certification	UL, CE & FCC
8	Warranty	3 year Standard Warranty

**19. 10/100/1000 Single Mode Media Converter: SME 124819**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's</b>	<b>Attachment file name.....</b>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<b>Authorization</b>	
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Physical Interface:	<ul style="list-style-type: none"> <li>It shall support one-channel media conversion between 1000BASE-T and 1000BASE-LX</li> <li>It shall support auto negotiation of duplex mode on twisted-pair port</li> <li>It shall support auto MDI/MDIX for twisted-pair port</li> </ul>
2	Distance	<ul style="list-style-type: none"> <li>It shall support maximum fiber cable distance up to 10Km.</li> </ul>
3	Features	<ul style="list-style-type: none"> <li>It shall support full wire-speed forwarding rate</li> <li>It can be used as a stand-alone device or with chassis</li> <li>It shall support Hot-swappable when used with chassis</li> <li>It shall support link Pass Through function</li> <li>Jumbo frame 10k</li> <li>Compliance Features: Emission (EMI): FCC EN 60950,(TUV), UL 60950 (cULus), CE compliant, EN 60825, Conforms to EN 55024 immunity standard EMI/RFI FCC Class A, EN 55022 Class A, VCCI Class A,C-TICK</li> </ul>
4	Wavelength	<ul style="list-style-type: none"> <li>It shall support wavelength 1300nm</li> </ul>
5	Temperature	<ul style="list-style-type: none"> <li>Operating Temperature: 0 - 40 C</li> </ul>
6	Humidity	<ul style="list-style-type: none"> <li>Up to 90%</li> </ul>
7	Certification	<ul style="list-style-type: none"> <li>UL, CE &amp; FCC</li> </ul>
8	Warranty	3 year Standard Warranty

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**STRUCTURED CABLING****20. Cat 6 UTP, 4 Pair Network Cable:SME 124820**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	Category 6 Unshielded Twisted Pair 4 pair 100• cable shall be compliant with ANSI/TIA/EIA-568-C.2 Additional Transmission Performance Specifications for 4-pair 100• Category 6Cabling Category 6 UTP cables shall extend between the work area location and its associated telecommunications closet and consist of 4 pair, 23 AWG, UTP The 4 pair Unshielded Twisted Pair cable shall be UL• & ERTL Listed
	Mechanical Characteristics	Construction: 4 twisted pairs separated by internal X shaped, 4 channel, polymer spine / full separator. Half shall not be accepted Conductor Solid bare Copper Conductor Diameter 0.56±0.005mm (23 AWG) Insulation :High Density Polyethylene Jacket PVC Outer Diameter 6.1 mm nominal

**21****Cat 6 UTP, Face Plate :****SME 124821**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	Single & DUAL square plate, Quad in Rectangular shape Write on labels in transparent plastic window – supplied with plate Screw hole covers – to be supplied with plate Face Plate with shutter Should be able to support variety of jacks – UTP

**22****Cat 6 UTP, Information Outlet:****SME 124822**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	Category 6, TIA568 C.2 All information outlets for 100 • , 22-26 AWG copper cable shall: Use insulation displacement connectors (IDC) Allow for a minimum of 200 re-terminations without signal degradation below standards compliance limits. Be constructed of high impact, flame-retardant thermoplastic with color and icon options for better visual identification. Shutter is on face plate Insertion force: 20N max ( IEC 60603-7-4 ) IDC : Housing PC + glass fiber , UL 94 V-2 568A/B configuration Information outlet (RJ45 jack) should be covered under ETL Verification program for compliance with TIA568.C.2
	Mechanical:Jack Connector	Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent Operating Life: Minimum 750 insertion cycles Contact Material: Copper alloy Contact Plating: 50 µinches gold on plug contact area Plastic Housing: Polycarbonate + glass fiber UL94V-2 rated Operating Life: Minimum 200 Re-terminations IDC Contact Plating: Phosphor bronze with tin plated

**23 Cat 6 UTP, 24 Port Jack Panel Loaded****SME 124823**

<b>Sl. No.</b>	<b>Detail</b>	<b>Requirements</b>
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	Be made of powder coated steel, in 24 port configurations. Allow for a minimum of 200 re-terminations without signal degradation below standards compliance limit. Have port identification numbers on the front of the panel Should have self adhesive, clear label holders (transparent plastic window type) and white designation labels with the panel, with optional color labels / icons IDC: Suitable for 22-26 AWG stranded and solid wire compatible with both 110 & Krone punch down tools Each port / jack on the panel should be individually removable on field from the panel Improved cable management with optional cable management bar The Cat-6 transmission performance is in compliance with the ANSI/TIA/EIA 568C.2 standard
	Mechanical Characteristics: Jack Connector	Plastic Housing: ABS , UL94V-0 rated Operating Life: Minimum 750 insertion cycles Contact Material: Copper Alloy Contact Plating: 50µ" Gold plated on plug contact area Contact Force: 20N max ( IEC 60603-7-4) Plug Retention Force: 15 lb

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	IDC Connector	Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent IDC cap : ABS, UL 94V -0 Contact Material: Copper Alloy IDC Contact Plating: Phosphor bronze with tin plated Insertion Force: 20N max (IEC 60603-7-4) Wire Accommodation: 22-26 AWG solid
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**24. Cat 6 UTP, Patch Cords:****SME 124824**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>PI specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	Category 6 Equipment cords The work area equipment cords shall, at a minimum comply with proposed ANSI/TIA/EIA-568-C.2 Commercial Building Cabling Standards Transmission Performance Specifications for 4 pair 100• Category 6 Cabling Equipped with modular 8-position modular plugs on both ends, wired straight through with standards compliant wiring Should have 50 micro inches of gold plating over nickel contacts Should be covered by ETL verification program for compliance with TIA 568.C.2
	Mechanical - Cable	Conductor size: 24 AWG stranded bare Max O.D.: 5.0mm Jacket: PVC UL-94V-O Temperature range: -10 deg C to +80 deg C
	Mechanical Characteristics - Plug	Operating life: Minimum 750 insertion cycles Contact blade: Phosphor bronze Contact plating: 50µ" Gold
	Electrical Characteristics - Plug	Di-electric withstanding voltage: 500 V AC Insulation resistance : 35 M Ohm (Max)

**25. Fiber Cabling Components OFC Single Mode 24 Core Fiber:****SME 124825**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>PI specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	<b>GENERAL:</b>	The fiber type is a Matched Cladding Single Mode Low water peak fiber The fiber is optimized for operation at 1310 nm and at 1550 nm Should fulfill the requirements of: <ul style="list-style-type: none"><li>• IEC 793-2: 1992,</li><li>• EN 188101</li><li>• ITU-T Recommendation G.652D</li></ul> Testing methods are in accordance with the following standards:



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• ITU-T G.652.D</li> <li>• IEC 793-1</li> <li>• EN 188 000</li> </ul>
	<b>GEOMETRICAL PROPERTIES:</b>	Nominal mode field diameter 9.2 $\mu\text{m}$ Mode field diameter tolerance $\pm 4\%$ Cladding diameter 125 $\mu\text{m}$ Cladding diameter tolerance $\pm 1 \mu\text{m}$ Mode field concentricity error $< 1 \mu\text{m}$ Cladding non-circularity $< 2 \%$
	<b>MATERIALS</b>	CORE: Germanium doped core with no phosphorus i.e. reduced tendency for hydrogen degradation COATING: UV-curable dual layer acrylate coating, which ensures excellent micro bending and abrasion resistance  Stripping force after conditioning at $23 \pm 5^\circ\text{C}$ at 40 - 60 % RH for 24 h Min: 1.0 N Max: 3.5 N  Stripping force after ageing in water at $70 \pm 5^\circ\text{C}$ for 168 h Min: 1.0 N Max: 3.5 N
	<b>OPTICAL PROPERTIES</b>	Attenuation (of cable with fibers): At 1310 nm : $\leq 0.36 \text{ dB/km}$ In the range 1285-1330 nm: $\leq 0.40 \text{ dB/km}$ At 1550 nm: $\leq 0.22 \text{ dB/km}$  Cut-off wavelength <sub>hc</sub> : High limit: 1330 nm Low limit: 1180 nm  Cut-off wavelength <sub>hcc</sub> : High limit: 1260 nm  Loss increase at 1550 nm for 100 turns of fiber loosely wound with a 37.5 mm radius: Max: 0.1 db
	<b>Dispersion:</b>	Zero dispersion wavelength: 1310 nm Tolerance of zero dispersion Wavelength: $-10/+12 \text{ nm}$  Zero-dispersion slope: Max: $0.092 \text{ ps}/(\text{nm}^2 \cdot \text{km})$  Chromatic dispersion coefficient: In 1285 nm - 1330 nm interval: Max: $3.5 \text{ ps/km} \cdot \text{nm}$  In 1270 nm - 1340 nm interval Max: $6 \text{ ps/km} \cdot \text{nm}$  At 1550 nm Max : $18 \text{ ps/km} \cdot \text{nm}$

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	<b>Polarisation (PMD)</b>	<b>Mode</b>	<b>Dispersion</b>	Max: <=0.2 ps/km In homogeneity of OTDR trace for any two 1000 meter fiber lengths: Max: 0.1 dB/km Proof test level: 1%
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**26. Fiber Cabling Components Single Mode Fiber Patch Panels Rack Mount (LIU): SME 124826**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>PI specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
		Have sufficient slots accommodate Simplex/duplex SC/LC/FC adapters individually. Aluminum base material for light mounting Should have Splice Tray & Cable Spool provision inside Accessory kit consists of cable ties, mounting ear screw earthling and spiral wrap tube. Panel cover should be slide out for easy maintenance Can Include 48 LC,24SC,24 ST and 24 FC Terminations Removable Rear & Front cover for better access to interior of LIU

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**27. Fiber Cabling Components Single Mode Adapters: SME 124827**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>PI specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	All SC/LC/FC adaptors should be Simplex and duplex type. Adapters should have compact design & high precision, which perform well under various circumstances & maintain good plug retention strength.  Telcordia, TIA/EIA, IEC compliance
	Insertion Loss	0.20db for Zirconia Sleeve
	Sleeve/Ferrule Withdrawal Force	SC / FC Adapter 2.0N ~ 5.9N, LC Adapter-1.0N ~ 2.5N

**28. Fiber Cabling Components Single Mode Connectors: SME 124828**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>PI specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	Provide a field installable single mode connector to terminate fiber optic cables from cable-to-cable, cable-to-equipment and equipment-to-equipment. The connector must: Be field installable Utilize a PC polishing on the tip to provide high yield during installation Meet EIA and IEC standards for repeatability
	Insertion Loss	<0.3 db
	Mating Cycle	1000 Times

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	Return Loss	> 50 db
	Operating Temp.	-40 deg C. to +85 deg.c
	Standard	IEC 61754-20
	Types	SC/LC/FC

**29. Fiber Cabling Components Single Mode Fiber Patch Cords/Pigtails: SME 124829**

Sl. No.	Detail	Requirements
	Make	PI specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
	Features	<p>All optical fiber patch leads shall comprise of Single mode 9/125µm fiber with SC/LC/FC, fiber connectors terminated at each end</p> <p>Optical Fiber – Corning Single Mode</p> <p>Connector: Zirconia ceramic ferrule</p> <p>Pre-radiuses and pre-polished ferrule</p> <p>Simplex / Duplex</p> <p>Color-coded Yellow for SM</p> <p>Insertion Loss - &lt;0.2 db</p> <p>Cable: 9/125, SM</p> <p>Repeatability - &lt; 0.2 db</p> <p>Durability – 1000 mating cycle</p> <p>Working Temp : -40 deg C.to + 85 deg. C</p> <p>Standard : G652D, G 657A &amp; G 657B</p> <p>Length : 1,2,3,5 as required per project</p>

**Network Switches**

30	Managed 10/100 Switch with Fiber ports:	
Sl. No.	Detail	Requirements
	Make	PI specify
	Model	PI specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Features	<p>Bandwidth Control Storm Control</p> <p>IGMP Snooping (v1/v2/v3)</p> <p>Flow Control – HOL Blocking Prevention</p> <p>Port Mirroring – One-to-One and Many-to-One</p> <p>Compliance Features: FCC Class A, CE Class A, VCCI Class A, IC, C-Tick, UL/cUL Listed, LVD</p>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

2	MAC Address	16K Support, 256 and above static MAC
3	Max Forwarding Rate	12 Mbps
4	Flash Memory:	128 MB
5	RAM	256 Mb
6	VLAN	802.1Q Tagged VLAN
		VLAN Group
		Support 32 static VLAN group
		Port-based VLAN
		Supports 1 management VLAN
7	QoS	8 Queues per port
		802.1p Supports WRR and Strict Priority
8	ACL	Max 500 Profiles
		Max 1000 rules shared by all profiles
9	Security	802.1X forwarding
		Allows specifying of threshold in terms of Kbps for each port
		Allows detection when broadcast/multicast / unknown unicast traffic hit the definable threshold, the switch will start blocking or discarding packets which would otherwise 'flood' the network. The blocked port will be activated again only when the broadcast/ multicast traffic falls below the defined threshold
		Min granularity: 64Kbps
		Protects CPU from Broadcast / Multicast / Unicast flooding
		Port Security
		ARP Spoofing Prevention – max 64 entries
		HTTPS over SSL
10	Protocols	Should support 802.1d STP, 802.1w RSTP,IEEE 802.1s, 802.3ad Link Aggregation, SNMP v1/v2c/v3,
11	Management	Web-based GUI
		CLI
		Telnet Server
		Telnet Client
		System Log
		BootP/DHCP Client
		SNTP
		Configuration File Upload/Download
		Firmware File Backup/Upgrade
		DHCP Auto-Configuration
12	Certification	UL, CE & FCC
13	Warranty	3 years Standard Warranty

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**31. Managed 10/100 Switch as per above specs:**

Sl. No.		Requirements
1	SME 124830	24 port • 24 x 10/100 Ports + 2 Combo 10/100/1000 Base-T/SFP Ports/12 Gbps Switching Capacity/512KB Packet Buffer
2	SME 124831	48 port • 48 x 10/100 Ports + 2 Combo 10/100/1000 Base-T/SFP Ports/17Gbps Switching Capacity/1 Mb Packet Buffer

32.	<b>Layer 2 10/100 Switch:</b>		
	Sl. No.	Detail	Requirements
		<b>Make</b>	<b>Pl specify</b>
		<b>Model</b>	<b>Pl specify</b>
		<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
		<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	1	L2 Features	L2 Managed Switch with 24-Port 10/100Mbps + 2 100/1000 SFP Combo 10/100/1000BASE-T/SFP
			The switch should be 19" rack mountable & at most 1U rack height
			Should Support 802.3x
			The switch should have IEEE 802.1D STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP features, Ring Rapid Spanning Tree (RRSTP).
			Switch shall support Root Guard, BPDU guard or equivalent features
			The switch should have IEEE 802.3ad Link Aggregation feature with at least 32 groups & 8 ports per group
			Should have Port Mirroring One to one/Many to One & Mirror in Tx/Rx/Both and sFLOW.
			Switch should have the intelligence to detect the loop occurring in the unmanaged network segment
			IGMP Snooping v1 ,v2 , IGMP v3 awareness , atleast 64 IGMP snooping group,MLDv1/V2.
			Switch should have Non-blocking wire speed switch fabric
			Compliance Features: FCC Class A, CE Class A, VCCI Class A, C-Tick, UL/cUL Listed, LVD& IPv6 Host ready certification
	2	MAC Address	16K
			256 Static MAC Address
	3	Switching Capacity	12.8Gbps
	4	Max Forwarding Rate	9.5Mpps
	5	Flash Memory:	8 MB
	6	SD RAM	64 Mb
	7	Packet Buffer	380 KB
	8	VLAN	Support At least 4000 VLANs, support GVRP and dynamic VLAN upto 255 , IEEE 802.1q, Port based VLAN, protocol based VLAN (802.1v), , Asymmetric VLAN, VLANtrunkingAuto Voice VLAN

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

			The switch should have feature of gratuitous ARP	
	9	QoS	The switch should have following QoS features: priority queue mapping based on 802.1p & DSCP, atleast 4 queues per port, Strict priority queues	
			Shall support following load sharing mechanism based on following Source MAC, Destination MAC, Source MAC + Destination MAC, Source IP, Destination IP, Source IP + Destination IP	
			The switch should have CoS based on port 802.1p priority, VLAN ID, MAC Address, ether type, IP address, DSCP, protocol type, TCP/UDP port number	
			The switch should have port based ingress & egress bandwidth control & flow based ingress bandwidth control support with granularity of 62.5 Kb/s	
	10	ACL	The switch should have access control list feature based on 802.1p priority, MAC address, VLAN ID, Ether type, DSCP, IPv4 address, protocol type, TCP/UDP port number	
	11	Security	The switch should have following security feature like SSHv2, HTTPS over SSL, port security, Unicast broadcast & multicast storm control, port isolation, binding of MAC address & IP address with interface, CPU protection mechanism, DHCP server screening, DHCP client filtering	
			Switch shall support DoS Attack prevention, ARP spoofing prevention, port based 802.1x access control, Host based 802.1x access control, Guest VLAN, Microsoft 802.1x NAP support, RADIUS, TACACS+, Extensible Authentication Protocol (EAP)	
	12	Management	<ul style="list-style-type: none"> <li>The switch should have following management features like web based GUI, CLI, telnet server &amp; client, TFTP client, SMMPv1/v2/v3, RMON v1/v2, LLDP, LLDP-MED</li> </ul>	
			<ul style="list-style-type: none"> <li>Switch shall support DHCP client, DHCP relay, dual Image, dual configuration, Syslog, SNMP, SMTP</li> </ul>	
	13	Certification	UL, CE & FCC	
	14	Warranty	3 years Standard Warranty	

**34. Layer 2 Managed 10/100 Switch as per above specs:**

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

Sl. No.		Requirements
1	SME 124833	24 port • 24 x 10/100Mbps + 2 100/1000 SFP + 2 Combo 10/100/1000BASE-T/SFP, 12 Gbps Switching Capacity/9 Mpps Forwarding capacity/384 Kb Packet Buffer
2	SME 124834	48 port • 48 x 10/100Mbps + 2 100/1000 SFP + 2 Combo 10/100/1000BASE-T/SFP, 17 Gbps Switching Capacity/13 Mpps Forwarding capacity/1.5 MB Packet Buffer

35.	<b>PoE Based 10/100 Switch:</b>		
	Sl. No.	Detail	Requirements
		<b>Make</b>	<b>Pl specify</b>
		<b>Model</b>	<b>Pl specify</b>
		<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
		<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	1	Features	Green Technology
			IGMP Snooping, v2/v3 snooping, MLD Snooping v1/v2
			L2 Multicast Filtering
			Spanning Tree Protocol (802.1D, 802.1w)
			802.3ad Link Aggregation, IEEE 802.17/equivalent for sub 50ms ring protection and should seamlessly integrate with core/aggregation switch
			Port Mirroring,Sflow
			Compliance Featuers: FCC Class A, CE Class A, VCCI Class A, IC, C-Tick, cUL,IP 30 protection class, DIN rail mounting
	2	MAC Address	4K
	3	VLAN	Shall Support
			802.1Q tagged VLAN
			VLAN Group (Max 256 Static VLAN groups)
			Management VLAN
			VLAN
	4	QoS	802.1p
			Support 4 ports per queue
			WRR/Strict
	5	ACL	Max. 256 ingress ACL profiles



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

			Max. 256 ingress ACL rules shared by profiles
	6	Security	<ul style="list-style-type: none"> <li>802.1X forwarding</li> <li>Allows specifying of threshold in terms of Kbps for each port</li> </ul> <p>Allows detection when broadcast/multicast / unknown unicast traffic hit the definable threshold, the switch will start blocking or discarding packets which would otherwise 'flood' the network. The blocked port will be activated again only when the broadcast/ multicast traffic falls below the defined threshold</p> <p>Min granularity: 64Kbps</p> <p>Protects CPU from Broadcast / Multicast / Unicast flooding</p> <p>Port Security</p> <p>support HTTPS over SSL, , RADIUS, TACACS+,</p>
	7	Management	<p>Web-based GUI</p> <p>CLI</p> <p>Telnet Client</p> <p>System Log</p> <p>BootP/DHCP Client</p> <p>SNTP, , DHCP client/server;</p> <p>Configuration File Upload/Download</p> <p>Firmware File Backup/Upgrade</p> <p>DHCP Auto-Configuration, , An USB or equivalent memory card socket , allowing software release files, configuration and other files to be stored for backup and distribution to other switches</p>
	8	Power	Support for IEEE 802.3af as well as IEEE 802.3at-compliant PoE, with 240W PoE budget (8 Port switch). Should support 60W on at least 2 ports. Dual power inputs and supplied with industrial grade power adapter
	9	Certification	UL, CE & FCC
	10	Environmental	Operating temp. -5°C to 65°C (-40°F to 157°F)
	11	Warranty	3 years Standard Warranty

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**36. 10/100 PoE Switch as per above specs:**

Sl. No.		Requirements
1	SME 124835	8 port • 8 x 10/100/1000 PoE Switch and 4 1G Base-X ports with 1.6Gbps Switching Capacity/1Mpps Forwarding capacity/384 Kb Packet Buffer or higher
2	SME 124836	24 port • 24 x 10/100PoESwitch with 12 Gbps Switching Capacity/9 Mpps Forwarding capacity/512 Kb Packet Buffer higher

**37. Network Management System Standard Edition:**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Features	<ul style="list-style-type: none"><li>• Network Management System Professional Edition</li><li>• The software shall have modular architecture supporting other software plug-ins to enrich the network's single window management capabilities. This shall support Wireless Network Management, AAA/RADIUS server, Network Access Control, Network Traffic Analyzer (using sflow/Netflow) with single window management.</li><li>• The Software make should be same as switch make proposed.</li></ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**38. Network Management System Professional Edition:**

Sl. No.		Requirements
1	SME 124837	License for 25 Nodes
2	SME 124838	License for 50 Nodes
3	SME 124839	License for 100 Nodes
4	SME 124840	License for 250 Nodes
5	SME 124841	License for 500 Nodes
6	SME 124842	License for 1000 Nodes
7	SME 124843	License for 5 Probes
8	SME 124844	License for 10 Probes
9	SME 124845	License for 25 Probes
10	SME 124846	License for 50 Probes
11	SME 124847	License for 100 Probes

**39. Core Switches :- 4 Slot Chassis Switch with single CPU engine: SME 124848**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	L2 Features	<p>Chassis Switch System offers scalable Layer 2 and 3 switching in a 8slot form factor of chassis.</p> <p>N+1 redundant load-sharing power modules</p> <p>8-slot switch provides a switchcapacity of up to 600 Gbps</p> <p>Flexible Modular Design 8-slot chassis Scalable expansion to 192 x 10/100/1000BASE-T, 96 SFP, or 16 10-Gigabit ports</p> <p>The Switch shall support IPv4/IPv6 Routing including IPv6 Tunnel, ICMPv6, IPv6 Neighbour Discovery(ND), DHCPv6, RIPng and OSPFv3</p> <p>Switch Should support active-active clustering VSS / equivalent technology for higher availability of Layer 2 and Layer 3 including video applications for hitless failover.</p> <p>The switch should support VSS/ equivalent clustering bandwidth of min 80Gbps with no single point of failure per switch Vendors should offer required cables/modules from day-1</p>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

			<p>Switch shall have high availability through in-service software upgrades (ISSUs),</p> <ul style="list-style-type: none"> <li>Switch shall have IPv4/IPv6 dual stack function(RFC2893, 4213)</li> </ul> <p>The proposed Ring protection technology shall have the high reliability functionality to handle dual failures and ensure the convergence of less than 50ms in case of more than one link broken in the ring.</p> <p>The proposed Ring protection technology shall be capable of handling data loop whose path traverse more than a single ring and the loop occurs when there is a break in a physical segment that is shared by two rings</p> <p>The proposed Virtual chassis technology shall support Link Aggregation between different Virtual chassis cluster members for high reliability</p> <p>The Switch should have  RIPv1(RFC1058)/RIPv2(RFC2453),RIPng,OSPFv2, OSPFv3, VRF from day 1</p> <p>The Switch should have Policy Based Routing ,BGP 4 , BGP+ v4 (IPv6) 2,&amp; VRRP</p> <p>Switch should have PIM-DM/SM/SDM for IPv4</p> <p>Switch should have IPv6 tunneling</p> <p>The Switch should have Up to 256 IP Interfaces &amp; 10K route entries or more</p> <p>The Switch should have Multi Path Routing support for Equal cost &amp; Weighted Cost / ECMP</p> <p>The Switch should have Flexible device/user authentication with 802.1x/MAC/captive portal</p> <p>The Switch should have IGMP Snooping v1,v2,v3 &amp; MLD Snooping</p> <p>IGMP/MLD multicast forwarding (IGMP/MLD proxy) , IGMP Snooping Fast - leave , IGMP Filtering , IGMP snooping mrouter ports, IGMP snooping report suppression , IGMP source address check , IGMP static entries, MLD Querier</p> <p>The Switch should have Spanning tree 802.1d,802.1w,802.1s</p> <p>Switch should have 802.3ad Link Aggregation Up to 30 groups per device</p> <p>Switch should have Port Mirroring One to one/Many to One</p> <p>Switch shall have the intelligence to detect the loop occurring from the unmanaged network segment</p>
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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

		Switch shall have the capability to build the trunk across stack
		It shall support LLDP and LLDP-MED including client location information. It shall exchange link and device information in multi-vendor networks
		Should support inbuilt wireless functionality for management of AP's
2	MAC Address	32K MAC addresses per chassis
3	Switching Capacity	The maximum Switching Capacity:  600 Gbps  - The maximum Backplane Switching Capacity:  600 Gbps
4	Max Forwarding Rate	The maximum Packet Forwarding Rate:  up to 357 million pkts/per sec  - The maximum Backplane Packet Forwarding Rate:  the IPv4 unicast traffic crossing backplane delivers up to 240 million pkts/per sec
5	Flash Memory:	CM-I: Flash: Prom 64MB
6	SD RAM	DDR 512 MB
7	Packet Buffer	2 MB for Non-blocking architecture
8	Jumbo Frame	9,732 Bytes
9	VLAN	The LAN switch should have IEEE 802.1Q VLAN encapsulation. Up to 4000 VLANs per switch and up to 4000 VLAN IDs.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<p>It shall have Automatic Negotiation of Trunking Protocol, to help minimize the configuration &amp; errors / IEEE 802.1Q</p> <p>Switch should have centralized VLAN Management. VLANs created on the Core Switches should be propagated to all the others switches automatically, thus reducing the overhead of creating/modifying/deleting VLANs in all the switches in turn eliminating the configuration errors &amp; troubleshooting.</p> <p>It shall support 802.1v &amp;Q-in-Q VLAN, Guest VLAN</p>
10	QoS	<p>It should support 802.1p Priority Queues (8 Queues)</p> <p>Queue Handling mode: WRR, Strict Mode</p> <p>Switch shall support three color marker with CIR/PIR minimum granularity of 1 kbps</p> <p>Class of service should be based on Switch port, DSCP, VLAN ID,TCP/UDP port, Protocol type,802.1p queues, IPv4/v6 address, IPv6 flow label &amp; User defined packet content</p>
11	ACL	<p>The LAN Switch shall have the capability to apply access list control based on IPv4/v6 address, Protocol type,IPv6 flow label, Time based ACL, DSCP, IPv6 traffic class, TCP/UDP Port, Switch port &amp; user defined packet content</p> <p>Switch shall support up to 256 Access Control Entries minimum</p>
12	Security	<p>The LAN switch shall support IEEE 802.1x to allow dynamic, port-based security, providing user authentication</p> <p>Switch shall support for Admission Control features to improve the network's ability to automatically identify, prevent and respond to security threats and also to enable the switches to collaborate with third-party such as Microsoft for security-policy compliance and enforcement before a host is permitted to access the network</p> <p>It shall support for SSHv2, SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions</p> <p>It shall support RADIUS local user database and authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.</p> <p>It shall support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database, and to rate limit the amount of DHCP traffic that enters a switch port</p> <p>It shall support DHCP Interface Tracker (Option 82) to augment a host IP address request with the switch port ID.</p> <p>It shall support that each end node can be isolated from each other and they should be able to connect to shared ports such as Internet and servers</p>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<p>It shall have IP-MAC-Port binding :</p> <p>Dynamic ARP Inspection</p> <p>IP Source Guard</p> <p>DHCP Snooping</p> <p>It shall have CPU Filtering to protect the CPU from Broadcast / Multicast / Unicast flooding &amp; protocol control packets attacks</p> <p>. Port Security up to 16 MAC addresses per port Broadcast/Multicast/Unicast Storm Control</p> <p>DoS Attack Prevention</p> <p>IP-MAC-Port Binding 2</p> <p>ARP Spoofing Prevention 2</p>
13	Management	<p>It shall have Web &amp; MAC Based Access Control</p> <ul style="list-style-type: none"> <li>▪ The LAN switch shall have CLI support to provide a common user interface and command set with all routers and switches of the same vendor</li> <li>▪ It shall have Remote Monitoring (RMON) software agent to support four RMON groups (history, statistics, alarms and events) for enhanced traffic management, monitoring and analysis.</li> <li>▪ It shall support Trivial File Transfer Protocol (TFTP) to reduce the cost of administering software upgrades by downloading from a centralized location.</li> <li>▪ It shall support Network Timing Protocol (NTP/SNTP) to provide an accurate and consistent timestamp to all intranet switches.</li> <li>▪ It shall support SNMPv1, SNMPv2c, and SNMPv3 and Telnet interface to deliver comprehensive in-band management, and a CLI-based management console to provide detailed out-of-band management</li> <li>▪ It shall provide management functions for network segments (access links and individual circuits), monitors individual links.</li> <li>▪ It shall have traffic monitoring for all network ports effective at gigabit speed or higher, shall not impact the network performance while providing the real time &amp; historical data of all devices from Layer 2 to Layer 7</li> </ul> <p>It shall support configuration rollback to replace current configuration with any saved configuration file.</p>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>Switch shall be capable to store multiple image file and configuration</li> <li>Switch shall consume less power through auto-detection of link status and cable length. /IEEE 802.3az</li> </ul> <p>An USB or equivalent memory card socket , allowing software release files, configuration and other files to be stored for backup and distribution to other switches</p> <p>DDM – Optical digital diagnostic monitoring as per SFF – 8472 or equivalent standards</p> <p>Technology Functionality to visual way to quickly identify the desired physical switch for maintenance or other purposes, by causing its LEDs to flash in a specified pattern , where similar switches are deployed in a rack for easy management and identification</p>
14	Certification	UL, CE, FCC & VCCI
15	Warranty	3 years Standard Warranty

**40. Core Switches: 12 Slot Chassis Switch with Dual CPU engine: SME 124849**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	L2 Features	<p>Chassis Switch System offers scalable Layer 2 and 3 switching in a 12 slot form factor of chassis. Up to 400 GE or 160 10GE ports connections Should support PoE as per IEEE 802.3af and IEEE 802.3at</p> <p>N=1 redundant load-sharing power modules. Should support AC as well as DC power supplies option</p> <p>12 slot switch provides a switch capacity of up to 1.9 Tbps</p> <p>Flexible Modular Design</p> <p>12 slot chassis</p> <p>2 open slot for CPU modules and 10 open slots for I/O modules.</p> <p>No embedded CPU, I/O or Power Supply module</p> <p>The Switch shall support IPv4/IPv6 Routing including IPv6 Tunnel, ICMPv6, IPv6 Neighbor Discovery (ND), DHCPv6, RIPng and OSPFv3</p>



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		Switch fabric shall have Up to 1.9 Tbps
		1. Should support active-active clustering VSS / equivalent technology for higher availability of Layer 2 and Layer 3 including video applications for hitless failover.
		2. The switch should support VSS/ equivalent clustering bandwidth of min 80Gbps with no single point of failure per switch Vendors should offer required cables/modules from day-1
		ITU-T G8032 Ethernet Ring Protection (ERPV2) designed for loop protection and fast convergence times (sub 50 ms) in ring topologies
		High availability through in-service software upgrades (ISSUs)
		Link Monitoring: link flap detection and link error counts to identify bad connections and automatically make adjustments to use the links that are good
		Enhanced VoIP and video performance with policy-based QoS
		Digital Diagnostic Monitoring (DDM): Real-time diagnostics of fiber connections for early detection of optical signal deterioration
		The Switch should have RIPv1(RFC1058)/RIPv2(RFC2453),RIPng,OSPFv2, OSPFv3, VRF-lite from day 1
		The Switch should have Policy Based Routing ,BGP 4 , BGP+ v4 (IPv6) 2,& VRRP
		Switch should have PIM-DM/SM/SDM for IPv4
		Switch should have IPv6 Tunneling
		The Switch should have Up 10K route entries or more
		The Switch should have Multi Path Routing support for Equal cost & Weighted Cost / ECMP
		The Switch should have Per port Limit IP Multicast Address Range for Control Packet
		The Switch should have IGMP Snooping v1,v2,v3 & MLD Snooping
		The Switch should have Spanning tree 802.1d,802.1w,802.1s
		Switch should have 802.3ad Link Aggregation Up to 30 groups per device
		Switch should have Port Mirroring One to one/Many to One
		Switch shall have the intelligence to detect the loop occurring from the unmanaged network segment
		Switch shall have the capability to build the trunk across stack
		It shall support LLDP and LLDP-MED including client location information. It shall exchange link and device information in multi-vendor networks
2	MAC Address	16K MAC addresses
3	Switching Capacity	- The maximum Backplane Switching Capacity: 1.9Tbps (with 2 CPU Engines)
4	Max Forwarding Rate	- The maximum Packet Forwarding Rate: IPv4 unicast traffic without crossing backplane delivers up to 1152 million pkts/per sec
5	Flash Memory:	CM-I:Flash: 256MB
6	SD RAM	DDR 1GB
7	Packet Buffer	32 MB for Non-blocking architecture
8	Jumbo Frame	9,732 Bytes
9	VLAN	The LAN switch should have IEEE 802.1Q VLAN encapsulation. Up to 4000 VLANs per switch and up to 4000 VLAN IDs. It shall have Automatic Negotiation of Trucking Protocol, to help minimize the configuration & errors/ IEEE 802.1q Switch should have centralized VLAN Management. VLANs created on the Core Switches should be propagated to all the others switches automatically, thus reducing the overhead of creating/modifying/deleting VLANs in all the switches in turn eliminating the configuration errors & troubleshooting. It shall support 802.1v &Q-in-Q VLAN, Guest VLAN

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

10	QoS	It should support 802.1p Priority Queues (8 Queues)
		Queue Handling mode: WRR & Strict Mode
		Switch shall support three color marker with CIR/PIR minimum granularity of 1 kbps
		Class of service should be based on Switch port, DSCP, VLAN ID, TCP/UDP port, Protocol type, 802.1p queues, IPv4/v6 address, IPv6 flow label & User defined packet content
11	ACL	The LAN Switch shall have the capability to apply access list control based on IPv4/v6 address, Protocol type, IPv6 flow label, Time based ACL, DSCP, IPv6 traffic class, TCP/UDP Port, Switch port & user defined packet content
		Switch shall support up to 256 Access Control Entries minimum
12	Security	The LAN switch shall support IEEE 802.1x to allow dynamic, port-based security, providing user authentication
		Switch shall support for Admission Control features to improve the network's ability to automatically identify, prevent and respond to security threats and also to enable the switches to collaborate with third-party such as Microsoft for security-policy compliance and enforcement before a host is permitted to access the network
		It shall support for SSHv2, SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions
		It shall support RADIUS authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.
		It shall support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database, and to rate limit the amount of DHCP traffic that enters a switch port
		It shall support that each end node can be isolated from each other and they should be able to connect to shared ports such as Internet and servers/ Private VLAN functionality
		It shall support that each end node can be isolated from each other and they should be able to connect to shared ports such as Internet and servers
		It shall have IP-MAC-Port binding :
		Dynamic ARP Inspection
		IP Source Guard
		DHCP Snooping
		It shall have CPU Filtering to protect the CPU from Broadcast / Multicast / Unicast flooding & protocol control packets attacks
		· Port Security up to 16 MAC addresses per port
		Broadcast/Multicast/Unicast Storm Control
13	Management	DoS Attack Prevention
		IP-MAC-Port Binding
		ARP Spoofing
		It shall have Web & MAC Based Access Control
		· The LAN switch shall have CLI
		· It shall have Remote Monitoring (RMON) software agent to support four RMON groups (history, statistics, alarms and events) for enhanced traffic management, monitoring and analysis.
		· It shall support Trivial File Transfer Protocol (TFTP) to reduce the cost of administering software upgrades by downloading from a centralized location.
		· It shall support Network Timing Protocol (NTP/SNTP) to provide an accurate and consistent timestamp to all intranet switches.
		· It shall support SNMPv1, SNMPv2c, and SNMPv3 and Telnet interface to deliver comprehensive in-band management, and a CLI-based management console to provide detailed out-of-band management
		· It shall provide management functions for network segments (access links and individual circuits), monitors individual links.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

		<ul style="list-style-type: none"> <li>It shall have traffic monitoring for all network ports effective at gigabit speed or higher, shall not impact the network performance while providing the real time &amp; historical data of all devices from Layer 2 to Layer 7 /s flow</li> </ul>
		It shall support configuration rollback to replace current configuration with any saved configuration file.
		<ul style="list-style-type: none"> <li>Switch shall be capable to store multiple image file and configuration</li> </ul>
		<ul style="list-style-type: none"> <li>Switch shall consume less power through auto-detection of link status and cable length</li> </ul>
		The switch shall have pro active intelligence to create an ICMP polling for service reach ability based on IP address and configure pro active action upon loss or re establishment of the service reach ability
		Event-based triggers allow user-defined scripts to be executed upon selected system events based on Time , Date , day and Event based
		Should support inbuilt wireless controller functionality for the management of Wi-Fi access points
		USB interface for taking backup of software release files configurations
		Technology Functionality to visual way to quickly identify the desired physical switch for maintenance or other purposes, by causing its LEDs to flash in a specified pattern , where similar switches are deployed in a rack for easy management and identification
14	Certification	UL, CE, FCC & VCCI
15	Warranty	3 years Standard Warranty

**41.**

**Transceivers :- 1G Transceivers for Single Mode Fiber SME 124850**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	<ul style="list-style-type: none"> <li>It should support 1000BASE-LX port single mode fiber (IEEE 802.3z standard)</li> <li>It should support 10 km , 3.3V</li> <li>It should be Duplex LC connector</li> <li>Full duplex operation</li> <li>802.3x flow control support</li> <li>Fiber type: 9um single-mode fiber up to 10 km</li> <li>Wave length: 1310nm</li> <li>Power support: 3.3V</li> <li>Power budget: 10.5dB</li> <li>Hot pluggable</li> <li>Class 1 laser product complies with EN 60825-1</li> <li>TTL signal detect indicator</li> </ul>
		Metal enclosure for lower EMI
14	Certification	SFP Transceiver should be CE,FCC,UL,VCCI, ERTL certified which should be functionally test and verified from ERTL and vendor need to present complete functional test report from ERTL
15	Warranty	3 years Standard Warranty

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**42.****Transceivers :- 10G Transceivers for Single Mode Fiber SME 124851**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
	Features	· It should support IEEE-802.3ae 10GBASE-SR
		· Form factor type should be SFP+
		· Fiber Channel FC-PI Standard 1200-SM-LL-L
		· Fiber Media Support Single-Mode
		· Distance capacity 10km
		· Hot Pluggable
		· MSA Compliant
		· RoHS Compliant
		· Speed 10 Gbps
		· Connector Duplex LC Connector
		· Wavelength 1310 nm
		Output Optical Power Max.: Max.: 0.5 dBm
		· Min.: -8.5 dBm

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		· Input Optical Power
		(RX Optical Power)
		Max.: 0.5 dBm
		Min.: -8.5 dBm
		· Cable Type Single-mode 9/125 um fiber
14	Certification	UL, CE,FCC,VCCI & ERTL
15	Warranty	3 years Standard Warranty

**43. CPU Engine for Chassis:**

**SME 124852**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Features	<ul style="list-style-type: none"> <li>Control Module for Chassis (CPU Engines) for chassis switches</li> </ul>

**44 Power Module for Chassis:**

**SME 124853**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Features	<ul style="list-style-type: none"> <li>Power Module for Chassis</li> </ul>

**45. Line Cards compatible with above Chassis:**

Sl. No.		Requirements
1	<b>SME 124854</b>	24 ports 10/100/1000Base-T Module
2	<b>SME 124855</b>	24 ports 10/100/1000Base-T PoE Module
3	<b>SME 124856</b>	48 ports SFP Module
4	<b>SME 124857</b>	24 ports 10/100/1000Base-T and 24 ports SFP Module
5	<b>SME 124858</b>	6 ports 10G XFP/SFP + Module

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

6	SME 124859	16 10GE SFP+ Module
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**46. Expansion Modules for 8 Port & 24 Port 10G Layer 3 Switch:**

Sl. No.		Requirements
1	SME 124860	8 x 1000BASE-T expansion module
2	SME 124861	8 x 10G SFP+ expansion module

**47. Redundant Power Supplies for above Switches (PoE and Non PoE):**

Sl. No.		Requirements
1	SME 124862	60W Single Redundant Power Supply
2	SME 124863	140W Single Redundant Power Supply
3	SME 124864	1200W Single Redundant Power Supply
4	SME 124865	589Watt Redundant Power Supply system

**ROUTERS****48. Fixed Router :****SME 124866**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Router Performance	It shall support minimum 50 kpps or higher
2	Flash Memory:	It shall support minimum 8MB expandable to 32 MB or higher
3	RAM	It shall support minimum 32 MB or higher
4	Physical Interface:	It shall have minimum <ul style="list-style-type: none"><li>5 10/100M Fast Ethernet ports ( 2 WAN and 3 LAN Ports) or higher</li><li>1 CONSOLE port</li></ul>
5	Data Link Layer Protocols	<ul style="list-style-type: none"><li>PPPoE (Server/Client)</li><li>802.1Q</li></ul>
6	Network Layer Protocols	<ul style="list-style-type: none"><li>ARP</li><li>Proxy-ARP</li><li>DNS</li><li>NAT</li><li>ICMP</li><li>IGMP</li><li>DHCP(Server/Client/Relay)</li></ul>
7	Routing Capabilities	<ul style="list-style-type: none"><li>Static</li><li>Default</li><li>PBR</li></ul>
8	Security	<ul style="list-style-type: none"><li>AAA Radius</li></ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• TACACS+</li> <li>• Firewall</li> <li>• L2TP</li> <li>• PPTP</li> <li>• GRE</li> <li>• IPSec</li> <li>• IKE</li> <li>• URL Filtering</li> </ul>
9	Network management	<ul style="list-style-type: none"> <li>• SNMP V1A/2/V3</li> <li>• RMON</li> <li>• Web Interface Management</li> </ul>

**49. Modular Multi-Service Integrated Router :**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Throughput	It shall support minimum 1000 kpps or better
2	Flash Memory:	It shall support minimum 16 Mb & should be upgradable up to 32 Mb or higher
3	Compact Flash Card	Should support upto 1G or higher
4	RAM	It shall support minimum 256 MB & should be upgradable upto 1 G
5	Switching & Security	<ul style="list-style-type: none"> <li>• It shall Compatible with IEEE 802.1p, IEEE 802.1q, IEEE 802.1x</li> <li>• It shall support STP, RSTP</li> <li>• It shall support Keep alive, port mirror, broadcast/multicast storm limitation</li> <li>• It shall support AAA shall support enable, local, Radius and TACACS+</li> <li>• It shall support PAP, CHAP, MS-CHAP</li> </ul>
6	Enhanced Network Services	<ul style="list-style-type: none"> <li>• It shall support Static route, directly-connected route and default route</li> <li>• It shall support RIPv1/v2, OSPFv2, BGPv4, IS-IS, MPLS</li> <li>• It shall support PBR policy routing</li> <li>• It shall support Fast Switch, Load-Balance</li> <li>• It shall support IPv6, DHCP Server/ Client/Relay, DNS, DNS host,DNS Proxy, DDNS</li> <li>• It shall support TFTP Client/Server, FTP Client</li> </ul>
7	Firewall	<ul style="list-style-type: none"> <li>• It shall support ACL, NAT</li> <li>• It shall support prevention of SYN flood, UDP flood or ICMP flood</li> <li>• It shall support ARP attack prevention, ARP-Scan and DHCP snooping</li> <li>• It shall support prevention of attacks from all kinds of network packets</li> </ul>
8	Virtual Private Network (VPN)	<ul style="list-style-type: none"> <li>• It shall support IKE IPSec VPN</li> <li>• It shall support L2TP, PPTP, GRE</li> </ul>
9	QOS Support	<ul style="list-style-type: none"> <li>• It shall support RSVP ,IGMP v1, v2 (Inter Group Management Protocol Version 2 as per , Multicast Routing support like PIM-SM, PIM-DM etc.</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

10	MPLS	<ul style="list-style-type: none"> <li>It shall support ATM, VPLS/ equivalent , MP-BGP, VRF or equivalent</li> <li>It shall support L2VPN, L3VPN, MPLS TE</li> </ul>
11	IPv6	<ul style="list-style-type: none"> <li>It shall support IPv6 ND, IPv6 PMTU, IPv6 FIB, IPv6 ACL</li> <li>It shall support IPv6 transition: NAT-PT, IPv6 tunnel</li> <li>It shall support IPv6 tunnel: manual tunnel, automatic tunnel, GRE tunnel, 6to4, ISATAP</li> <li>It shall support IPv6 route: IPv6 static route, RIPng, OSPFv3, IS-ISv6, BGP4+</li> </ul>
12	Management	<ul style="list-style-type: none"> <li>Network Management: SNMP/MIB/SYSLOG/RMON/HTTP management</li> <li>Local Management: CLI management and file system management</li> </ul>
13	Warranty	3 years Standard Warranty

**50. Modular Multi-Service Integrated Router :**

Sl. No.		Requirements
1	SME 124867	<b>Physical Interface</b> -- 2 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 interface slots
2	SME 124868	<b>Physical Interface</b> -- 2 * 10/100/1000 Mbps Gigabit Ethernet port, 16 * 10/100/1000 Mbps Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 HIC slots
3	SME 124869	<b>Physical Interface</b> -- 2 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 2 interface slots
4	SME 124870	<b>Physical Interface</b> -- 4 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 6 interface slots
5	SME 124871	<b>Physical Interface</b> -- 4 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 8 interface slots

**51. Interface Modules for above Routers:**

Sl. No.		Requirements
1	SME 124872	Single-path gigabit-Ethernet card
2	SME 124873	One port 10/100/1000M Base-T or SFP card
3	SME 124874	Single-path E1 card
4	SME 124875	Dual-path E1 card
5	SME 124876	Single-path serial card
6	SME 124877	Dual-path serial card
7	SME 124878	One port ISDN BRI card
8	SME 124879	8-path asynchronous serial card

**52. Interface Modules for above Routers:**

Sl. No.		Requirements
1	SME 124880	16-path FE/GE switching module
2	SME 124881	4-path channelized E1 module
3	SME 124882	8-path channelized E1 module
4	SME 124883	4-path E1 module



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**53. Redundant Power Supply for above Router:**

**SME 124884**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Features	<ul style="list-style-type: none"> <li>Redundant Power Supply as supported by Router</li> </ul>

**54. Wireless N 150 Router:**

**SME 124885**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Device Interface	<ul style="list-style-type: none"> <li>802.11n/g/b wireless.</li> <li>WAN 10/100 Ethernet port.</li> <li>4 LAN 10/100 Ethernet Port</li> <li>USB 2.0 port.</li> <li>Reset button</li> </ul>
2	Mobile Network's Supported	<ul style="list-style-type: none"> <li>EV-DO/CDMA</li> <li>HSPA+/HSUPA/HSDPA/UMTS</li> </ul>
3	Standards	<ul style="list-style-type: none"> <li>IEEE 802.11n/g/b,</li> <li>IEEE 802.3.</li> <li>IEEE 802.3u.</li> <li>USB 2.0</li> </ul>
4	Antenna	<ul style="list-style-type: none"> <li>External Detachable Wi-Fi Antenna</li> </ul>
5	WAN types	<ul style="list-style-type: none"> <li>Wired WAN</li> <li>3G USB dongles.</li> </ul>
6	Security	<ul style="list-style-type: none"> <li>WPA &amp; WPA2 (Wi-Fi Protected Access)</li> <li>WPS (Wi-Fi Protected Setup).</li> <li>WEP 64/128-bit encryption</li> </ul>
7	Advance Features	<ul style="list-style-type: none"> <li>3G Modem/Ethernet WAN backup.</li> <li>Auto WAN Failover.</li> <li>Load Sharing.</li> <li>DHCP Client/Server.</li> <li>Port Forwarding.</li> <li>QoS Management.</li> <li>DDNS</li> </ul>
8	Advance Firewall	<ul style="list-style-type: none"> <li>Network Address Translation (NAT)</li> <li>Stateful Packet Inspection (SPI)</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>DMZ</li> <li>Support MAC address filtering</li> <li>Website filtering</li> </ul>
9	VPN	<ul style="list-style-type: none"> <li>L2TP/PPTP/IPSEC VPN pass-through</li> <li>L2TP/PPTP connection</li> </ul>
10	Management	<ul style="list-style-type: none"> <li>Web based management</li> </ul>
11	LED	<ul style="list-style-type: none"> <li>Status</li> <li>WAN</li> <li>WLAN</li> <li>LAN</li> </ul>
12	Power Characteristics	<ul style="list-style-type: none"> <li>Input: 100 to 240 V AC, 50/60 Hz</li> <li>Output: 5 V DC, 750 mA</li> </ul>
13	Environmental Specifications	<ul style="list-style-type: none"> <li>Operating temp :- 0 to 40 °C</li> <li>Operating Humidity :- up to 90%</li> </ul>
14	Certifications	<ul style="list-style-type: none"> <li>CE</li> </ul>

**55. Wireless N 150 Cloud Router:**

**SME 124886**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Device Interface	<ul style="list-style-type: none"> <li>802.11n/g/b wireless.</li> <li>WAN /LAN10/100 Ethernet port.</li> <li>Mini USB port.</li> <li>Power Switch.</li> <li>USB 2.0 port.</li> <li>Reset button</li> </ul>
2	Mobile Network's Supported	<ul style="list-style-type: none"> <li>EV-DO/CDMA</li> <li>HSPA+/HSUPA/HSDPA/UMTS</li> </ul>
3	Standards	<ul style="list-style-type: none"> <li>IEEE 802.11n/g/b,</li> <li>IEEE 802.3.</li> <li>IEEE 802.3u.</li> <li>USB 2.0</li> </ul>
4	Antenna	<ul style="list-style-type: none"> <li>internal Antenna</li> </ul>
5	WAN types	<ul style="list-style-type: none"> <li>Wired WAN</li> <li>3G USB dongles.</li> <li>Wireless Hotspot.</li> </ul>
6	Operating Modes	<ul style="list-style-type: none"> <li>Router.</li> <li>Access Point</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• Repeater</li> <li>• Hot-spot</li> </ul>
7	Security	<ul style="list-style-type: none"> <li>• WPA &amp; WPA2 (Wi-Fi Protected Access)</li> <li>• WPS (Wi-Fi Protected Setup).</li> <li>• WEP 64/128-bit encryption</li> </ul>
8	Advance Features	<ul style="list-style-type: none"> <li>• Quick Router Setup app support (iOS, Android4).</li> <li>• Mobile app support (iOS, Android).</li> <li>• Application based Web File Access support.</li> <li>• DHCP Client/ Server</li> <li>• Guest Zone support.</li> <li>• UPnP support.</li> <li>• Wi-Fi WMM Quality of Service (QoS)</li> </ul>
8	Advance Firewall	<ul style="list-style-type: none"> <li>• Network Address Translation (NAT)</li> <li>• Stateful Packet Inspection (SPI)</li> <li>• DMZ</li> <li>• Support MAC address filtering</li> <li>• Website filtering</li> </ul>
9	Battery	<ul style="list-style-type: none"> <li>• Removable Li-ion rechargeable battery</li> </ul>
10	Management	<ul style="list-style-type: none"> <li>• Web based management</li> </ul>
11	LED	<ul style="list-style-type: none"> <li>• Status</li> <li>• USB</li> <li>• WLAN</li> <li>• LAN</li> </ul>
12	Power Characteristics	<ul style="list-style-type: none"> <li>• Input: 100 to 240 V AC, 50/60 Hz</li> <li>• Output: 5 V DC, 750 mA (via USB port)</li> </ul>
13	Environmental Specifications	<ul style="list-style-type: none"> <li>• Operating temp :- 0 to 40 °C</li> <li>• Operating Humidity :- up to 90%</li> </ul>
14	Certifications	<ul style="list-style-type: none"> <li>• CE, FCC</li> </ul>

**56. Wireless AC 750 Cloud Router:**

**SME 124887**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Device Interface	<ul style="list-style-type: none"> <li>• 802.11AC/n/g/b wireless upto750Mbps.</li> <li>• WAN 10/100 Ethernet port.</li> <li>• Mini USB port</li> <li>• 2 USB 2.0 port.</li> <li>• Reset button</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

2	Mobile Network's Supported	<ul style="list-style-type: none"> <li>• EV-DO/CDMA</li> <li>• HSPA+/HSUPA/HSDPA/UMTS</li> </ul>
3	Standards	<ul style="list-style-type: none"> <li>• IEEE 802.11 ac draft.</li> <li>• IEEE 802.11n/g/b,</li> <li>• IEEE 802.3.</li> <li>• IEEE 802.3u.</li> <li>• USB 2.0</li> </ul>
4	Antenna	<ul style="list-style-type: none"> <li>• internal Antenna</li> </ul>
5	WAN types	<ul style="list-style-type: none"> <li>• Wired WAN</li> <li>• 3G USB dongles.</li> <li>• Wireless Hotspot.</li> </ul>
6	Operating Modes	<ul style="list-style-type: none"> <li>• Broadband Router.</li> <li>• Mobile Router</li> <li>• Hot-spot.</li> <li>• Charger</li> </ul>
7	Wi-Fi Frequency	<ul style="list-style-type: none"> <li>• IEEE 802.11a: 5.15 GHz to 5.85 GHz</li> <li>• IEEE 802.11b: 2.4 GHz to 2.497 GHz</li> <li>• IEEE 802.11g/n: 2.4 GHz to 2.483.5 GHz</li> <li>• IEEE 802.11ac: 5.15 GHz to 5.85 GHz</li> </ul>
8	Security	<ul style="list-style-type: none"> <li>• WPA &amp; WPA2 (Wi-Fi Protected Access)</li> <li>• WPS (Wi-Fi Protected Setup).</li> <li>• WEP 64/128-bit encryption</li> </ul>
9	Advance Features	<ul style="list-style-type: none"> <li>• Quick Router Setup app support (iOS, Android4).</li> <li>• Mobile app support (iOS, Android).</li> <li>• Application based Web File Access support.</li> <li>• Ipv6 Support.</li> <li>• DHCP Client/ Server</li> <li>• Guest Zone support.</li> <li>• UPnP support.</li> <li>• DLNA Support.</li> <li>• Wi-Fi WMM Quality of Service (QoS)</li> </ul>
10	Advance Firewall	<ul style="list-style-type: none"> <li>• Network Address Translation (NAT)</li> <li>• Support MAC address filtering</li> <li>• Website filtering</li> </ul>
11	Battery	<ul style="list-style-type: none"> <li>• 4000mAh Li-ion rechargeable battery</li> </ul>
12	Management	<ul style="list-style-type: none"> <li>• Web based management</li> </ul>
13	LED	<ul style="list-style-type: none"> <li>• Power Status</li> <li>• Battery Status</li> </ul>
14	Power Characteristics	<ul style="list-style-type: none"> <li>• Input: 100 to 240 V AC, 50/60 Hz</li> <li>• Output: 5 V DC, 1A/0.5A (via USB port)</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

15	Environmental Specifications	<ul style="list-style-type: none"> <li>Operating temp :- 0 to 40 °C</li> <li>Operating Humidity :- Up to90%</li> </ul>
16	Certifications	<ul style="list-style-type: none"> <li>UL, CE &amp; FCC</li> </ul>

**57. ADSL2+ 1 Port Ethernet/USB Combo Router: SME 124888**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Basic Features	<ul style="list-style-type: none"> <li>One RJ45 Ethernet LAN port</li> <li>ONE RJ11 ADSL Port</li> <li>USB1.1/2.0 device port</li> <li>Factory reset button</li> <li>Transparent, learning bridge with spanning tree support</li> <li>IPv4, TCP, UDP, ICMP, ARP, RARP,</li> <li>proxy-ARP</li> <li>Static Routing</li> <li>DHCP Server/Client</li> <li>IGMP v1, v2 Proxy</li> <li>Dynamic DNS</li> <li>Network Address Translator (NAT)</li> <li>PPP with PAP/CHAP</li> <li>Raw/IP Filtering</li> <li>SPI</li> <li>L2TP/PPTP Pass Through</li> <li>VPN: IPSec Pass Through</li> <li>DoS (UDP, TCP), Detection of Known Attacks</li> <li>Detect port scan attack</li> <li>ID/Password Authentication</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• DIAGNOSTIC LEDS:- Power, DSL, Internet, Ethernet, USB</li> </ul>
2	ADSL Standards	<ul style="list-style-type: none"> <li>• ADSL STANDARDS</li> <li>• Full ADSL2+/2/1 standards</li> <li>• ANSI T1.413 Issue 2</li> <li>• Annex A,I,J,L,M</li> <li>• ITU G992.1 (G.dmt)</li> <li>• ITU G992.2 (G.lite)</li> <li>• ITU G992.3 ADSL2 (G.dmt.bis)</li> <li>• ITU G992.5 (G.dmt.bisplus )</li> </ul>
3	ATM Specifications	<ul style="list-style-type: none"> <li>• Support AAL5</li> <li>• Support 8 Permanent Virtual Circuits</li> <li>• (PVCs)</li> <li>• UBR, CBR, rt-VBR, nrt-VBR</li> <li>• ITU-T I.610</li> </ul>
4	Basic Protocol	<ul style="list-style-type: none"> <li>• Multiple protocol encapsulation over</li> <li>• AAL5:</li> <li>• Support Logical Link Control (LLC)</li> <li>• encapsulation</li> <li>• Support VC-based multiplexing</li> <li>• Support Bridged and Routing</li> <li>• PPP over AAL5:</li> <li>• Support LLC encapsulation</li> <li>• Support PPP over Ethernet Pass through</li> <li>• Support PPP over Ethernet</li> <li>• Classical IP over ATM</li> </ul>
5	Management	<ul style="list-style-type: none"> <li>• Configuration through Web interface</li> <li>• Configuration through Telnet connection</li> <li>• Implement Log &amp; Trace function</li> <li>• PVC&amp;ECO</li> <li>• TFTP, FTP and HTTP for firmware</li> <li>• Download</li> </ul>
6	Power Characteristic	<ul style="list-style-type: none"> <li>• 12VDC/0.5A switching power adaptor</li> </ul>
7	Environmental Specifications	<ul style="list-style-type: none"> <li>• OPERATING TEMPERATURE : 0 C to 40 Deg C</li> <li>• HUMIDITY : Up to 90%</li> </ul>
	Certification	CE

**Wireless N150 ADSL2+ 4 Port Ethernet Router:**

**SME 124889**

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**58.**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1		<ul style="list-style-type: none"> <li>• 4x 10/1/100/1000Base-TX MDI/MDIX RJ-45 ports</li> <li>• 1x inner pair RJ-11 ADSL port</li> <li>• Data Rate: <ul style="list-style-type: none"> <li>Downstream: up to 24Mbps</li> <li>Upstream: up to 1Mbps</li> </ul> </li> <li>• 5dbi antenna by default</li> <li>• Wireless on/off switch</li> <li>• Operating Frequencies: 2.4 ~ 2.497 GHz</li> <li>• LED indicators</li> <li>• Ethernet to ADSL Self-Learning Transparent Bridging</li> <li>• IP Static Routing</li> <li>• Routing Information Protocol (RIP, RIPv2)</li> <li>• Virtual Server/Equivalent Port Forwarding</li> <li>• Port Triggering</li> <li>• DHCP server, client, and relay</li> <li>• DNS Relay, DDNS</li> <li>• Simple Network Time Protocol (SNTP)</li> <li>• Firewall :- Built in NAT, MAC filtering, packet filtering, URL filtering, domain blocking, SPI, DOS, user Authentication PAP/CHAP, DMZ</li> <li>• VPN Pass-through:- PPTP, L2Tp, IPSec</li> <li>• QoS</li> </ul>
	Basic Features	
2		<ul style="list-style-type: none"> <li>• Operating Frequencies: 2.4 ~ 2.497 GHz</li> <li>• IEEE 802.11b, IEEE 802.11g, IEEE 802.11n compliant</li> <li>• Data Rate:</li> </ul>
	Radio Type	

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>802.11n</li> <li>20MHz BW: 150, 130, 117, 104, 78, 52, 39, 26, 13Mbps</li> <li>40MHz BW: 150, 130, 117, 104, 78, 52, 39, 26, 13Mbps</li> <li>802.11g: 54, 48, 36, 24, 18, 12, 9 &amp; 6 Mbps</li> <li>802.11b: 11, 5.5, 2 &amp; 1 Mbps</li> </ul>
3	Modulation	<ul style="list-style-type: none"> <li>802.11n: OFDM, BPSK, QPSK, 16QAM, 64QAM</li> <li>802.11g: PSK/CCK, DBPSK, DQPSK, OFDM, BPSK, QPSK, 16QAM, 64QAM</li> <li>802.11b: CCK(11&amp;5.5 Mbps), DQPSK (2Mbps), DBPSK (1Mbps), DSSS</li> </ul>
4	Wireless features	<ul style="list-style-type: none"> <li>Non-detachable SMA 5dbi antenna</li> <li>Multiple SSID</li> <li>MAC address ACL</li> <li>AES-CCM/CCMP engine</li> <li>802.11e WLAN QoS</li> <li>WPS (Wi-Fi Protected Setup)</li> <li>WLAN scheduling</li> <li>Quick Installation Wizard (DCC, Click and Connect)</li> </ul>
5	Security	<ul style="list-style-type: none"> <li>64/128 bits WEP data encryption</li> <li>WPA/WPA2 (Wi-Fi Protected Access)security</li> <li>Multiple SSIDs</li> <li>MAC address-based access control</li> </ul>
6	Network Protocol and Standards	<ul style="list-style-type: none"> <li>IEEE 802.11 b/g/n</li> <li>IEEE 802.3/802.3u</li> <li>IEEE 802.3x</li> <li>IEEE 802.1d</li> <li>IEEE 802.1x</li> <li>802.11e WLAN Qos</li> <li>ADSL Standards</li> <li>ADSL standards: Multi-mode, ANSI T1.413 Issue 2, ITU G.992.1 (G.dmt) Annex A, ITU G.992.2 (G.lite) Annex A, ITU G.994.1 (G.hs)</li> <li>ADSL2 standards: ITU G.992.3 (G.dmt.bis) Annex A/L/M, ITU G.992.4 (G.lite.bis) Annex A</li> <li>ADSL2+ standards: ITU G.992.5 Annex A/L/M <ul style="list-style-type: none"> <li>ATM &amp; PPP Protocols</li> </ul> </li> <li>ATM Forum UNI3.1/4.0 PVC (up to 8 PVCs)</li> </ul>



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• ATM Adaptation Layer Type 5 (AAL5)</li> <li>• ATM QoS (Traffic Shaping)</li> <li>• Bridged or routed Ethernet encapsulation</li> <li>• VC and LLC based multiplexing</li> <li>• PPP over Ethernet (PPPoE)</li> <li>• PPP over ATM (RFC 2364)</li> <li>• ITU-T I.610 OAM F4/F5</li> </ul>
7	Management	<ul style="list-style-type: none"> <li>• Web-based GUI configuration</li> <li>• 3-level login control for local/remote management</li> <li>• Graphic login authentication (CAPTCHA0029)</li> <li>• Telnet/SSH access for configuration</li> <li>• Local access via internal console pin (optional)</li> </ul>
8	Power Characteristics	<ul style="list-style-type: none"> <li>• POWER INPUT</li> </ul> Voltage 100-240 VAC Maximum power rating 24 W
9	Environmental Specifications	<ul style="list-style-type: none"> <li>• OPERATING TEMPERATURE 0 to 40 °C</li> <li>• OPERATING HUMIDITY : Up to 90%</li> </ul>
10	Certification	<ul style="list-style-type: none"> <li>• CE</li> <li>• EN55022/EN55024/EN300 328/EN301489</li> </ul>

**59. Wireless N300 ADSL2+ 4-Port Ethernet Router with USB: SME 124890**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	Basic Features	<ul style="list-style-type: none"> <li>• 4x 10/100Base-TX MDI/MDIX RJ-45 ports</li> <li>• 1x inner pair RJ-11 ADSL port</li> <li>• Data Rate: Downstream: up to 24Mbps Upstream: up to 1Mbps</li> <li>• Operating Frequencies: 2412 ~ 2484 MHz</li> <li>• Wireless on/off switch</li> <li>• WPS button</li> <li>• LED indicators</li> <li>• Ethernet to ADSL Self-Learning Transparent Bridging</li> <li>• IP Static Routing</li> <li>• Routing Information Protocol (RIP, RIPv2)</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• Virtual Server, Port Forwarding</li> <li>• Port Triggering</li> <li>• DHCP server, client, and relay</li> <li>• DNS Relay, DDNS</li> <li>• Simple Network Time Protocol (SNTP)</li> <li>• Firewall :- Built in NAT, MAC filtering, packet filtering, URL filtering, domain blocking, SPI, DOS, user Authentication PAP/CHAP, DMZ</li> <li>• VPN Pass-through:- PPTP, L2Tp, IPSec</li> <li>• QoS</li> </ul>
2	Radio Type	<ul style="list-style-type: none"> <li>• 802.11n:</li> <li>• 20MHz BW: 150, 130, 117, 104, 78, 52, 39, 26, 13Mbps</li> <li>• 40MHz BW: 300, 150, 130, 117, 104, 78, 52, 39, 26, 13Mbps</li> <li>• 802.11g: 54, 48, 36, 24, 18, 12, 9 &amp; 6 Mbps</li> <li>• 802.11b: 11, 5.5, 2 &amp; 1 Mbps</li> </ul>
3	Modulation	<ul style="list-style-type: none"> <li>• 802.11n: PSK/CCK, DBPSK, DQPSK, OFDM etc.</li> <li>• 802.11g: PSK/CCK, DBPSK, DQPSK, OFDM, BPSK, QPSK, 16QAM, 64QAM</li> <li>• 802.11b: CCK(11&amp;5.5 Mbps), DQPSK (2Mbps), DBPSK (1Mbps), DSSS</li> </ul>
4	Wireless features	<ul style="list-style-type: none"> <li>• 2 Non-detachable SMA 5dbi antenna</li> <li>• Multiple SSID</li> <li>• MAC address ACL</li> <li>• AES-CCM/CCMP engine</li> <li>• 802.11e WLAN QoS</li> <li>• WPS (Wi-Fi Protected Setup)</li> <li>• WLAN scheduling</li> <li>• Quick Installation Wizard (DCC, Click and Connect)</li> </ul>
5	Security	<ul style="list-style-type: none"> <li>• 64/128 bits WEP data encryption</li> <li>• WPA/WPA2 (Wi-Fi Protected Access)security</li> <li>• Multiple SSIDs</li> <li>• MAC address-based access control</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

6	Network Protocol and Standards	<ul style="list-style-type: none"> <li>• IEEE 802.11 b/g/n</li> <li>• IEEE 802.3/802.3u</li> <li>• IEEE 802.3x</li> <li>• IEEE 802.1d</li> <li>• IEEE 802.1x</li> <li>• 802.11e WLAN Qos</li> <li>• ADSL Standards</li> <li>• ADSL standards: Multi-mode, ANSI T1.413 Issue 2, ITU G.992.1 (G.dmt) Annex A, ITU G.992.2 (G.lite) Annex A, ITU G.994.1 (G.hs)</li> <li>• ADSL2 standards: ITU G.992.3 (G.dmt.bis) Annex A/L/M, ITU G.992.4 (G.lite.bis) Annex A</li> <li>• ADSL2+ standards: ITU G.992.5 Annex A/L/M <ul style="list-style-type: none"> <li>○ ATM &amp; PPP Protocols</li> </ul> </li> <li>• ATM Forum UNI3.1/4.0 PVC (up to 8 PVCs)</li> <li>• ATM Adaptation Layer Type 5 (AAL5)</li> <li>• ATM QoS (Traffic Shaping)</li> <li>• Bridged or routed Ethernet encapsulation</li> <li>• VC and LLC based multiplexing</li> <li>• PPP over Ethernet (PPPoE)</li> <li>• PPP over ATM (RFC 2364)</li> <li>• ITU-T I.610 OAM F4/F5</li> </ul>
7	Management	<ul style="list-style-type: none"> <li>• Web-based GUI configuration</li> <li>• 3-level login control for local/remote management</li> <li>• Graphic login authentication (CAPTCHA0029)</li> <li>• Telnet/SSH access for configuration</li> <li>• Local access via internal console pin (optional)</li> </ul>
8	Power Characteristics	<ul style="list-style-type: none"> <li>• External Power Adapter Input: 100-240VAC, 50/60Hz Output: 12V DC, 1A</li> </ul>
9	Environmental Specifications	<ul style="list-style-type: none"> <li>• OPERATING TEMPERATURE 0 to 40 °C</li> <li>• OPERATING HUMIDITY : Up to 90%</li> </ul>
10	certifications	<ul style="list-style-type: none"> <li>• CE</li> </ul>

**60. Wireless N150 Desktop PCI Adapter:**

**SME 124891**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Basic Features	<ul style="list-style-type: none"> <li>• Compatible with IEEE 802.11n standard to provide up to 150Mbps data rate.</li> <li>• Compatible with IEEE 802.11g standard to provide up to wireless 54Mbps data rate</li> <li>• Compatible with IEEE 802.11b standard to provide up to wireless 11Mbps data rate</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>• Operation at 2.4 ~ 2.5GHz frequency band to meet worldwide regulations</li> <li>• Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, 54 for IEEE 802.11g.</li> <li>• Dynamic data rate scaling at 1, 2, 5.5, and 11Mbps for IEEE 802.11b</li> <li>• Maximum reliability, throughput and connectivity with automatic data rate switching</li> <li>• Support wireless data encryption with 64/128-bit WEP for security</li> <li>• Support infrastructure networks via Access Point and ad-hoc network via peer-to-peer communication</li> <li>• Support WEP, WPA and WPA2 enhanced security</li> <li>• Friendly user configuration and utilities</li> <li>• Drivers support Windows XP 32/64-bit, Vista 32/ 64-bit, Windows 7 32/ 64-bit</li> <li>• Support WPS setup to connect Access Point easily</li> <li>• PCI Local Bus 3.3V / 5V Compliance</li> <li>• RoHS compliant</li> <li>• An External Omni-directional antenna</li> <li>• Interoperability, driver backward compatibility</li> </ul>
2	Radio Type	<ul style="list-style-type: none"> <li>• FREQUENCY RANGE 2.4 GHz to 2.4835 GHz</li> <li>• Compatible with IEEE 802.11n standard to provide up to 150Mbps data rate.</li> <li>• Compatible with IEEE 802.11g standard to provide up to wireless 54Mbps data rate</li> <li>• Compatible with IEEE 802.11b standard to provide up to wireless 11Mbps data rate</li> </ul>
3	Modulation	<ul style="list-style-type: none"> <li>• IEEE 802.11b:- DQPSK, DBPSK, DSSS, and CCK</li> <li>• IEEE 802.11g:- BPSK, QPSK, 16QAM, 64QAM, and OFDM</li> <li>• IEEE802.11n:- BPSK, QPSK, 16QAM, 64QAM with OFDM</li> </ul>
4	Security	<ul style="list-style-type: none"> <li>• 64/128-bit WEP data encryption</li> <li>• Wi-Fi Protected Access (WPA/WPA2)</li> <li>• Wi-Fi Protected Setup (WPS)</li> </ul>
5	Network Protocol and Standards	<ul style="list-style-type: none"> <li>• IEEE 802.11n</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

		<ul style="list-style-type: none"><li>IEEE 802.11g</li><li>IEEE 802.11b</li></ul>
6	Power Characteristics	<ul style="list-style-type: none"><li>OPERATING VOLT AGE 3.3 V and 5 V</li></ul>
7	Environmental Specifications	<ul style="list-style-type: none"><li>OPERATING TEMP:- 0 °C to 40 °C</li><li>OPERATING HUMIDITY:- Up to 90%</li></ul>
8	Certifications	<ul style="list-style-type: none"><li>CE, FCC</li></ul>

**61. Wireless N150 Pico USB Adapter:****SME 124892**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1		<ul style="list-style-type: none"><li>Compatible with IEEE 802.11n standard to provide up to 150Mbps data rate.</li><li>Compatible with IEEE 802.11g standard to provide up to wireless 54Mbps data rate</li><li>Compatible with IEEE 802.11b standard to provide up to wireless 11Mbps data rate</li><li>Operation at 2.4 ~ 2.5GHz frequency band to meet worldwide regulations</li><li>Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, 54 for IEEE 802.11g.</li><li>Dynamic data rate scaling at 1, 2, 5.5, and 11Mbps for IEEE 802.11b</li><li>Maximum reliability, throughput and connectivity with automatic data rate switching</li><li>Support infrastructure networks via Access Point and ad-hoc network via peer-to-peer communication</li><li>Friendly user configuration and utilities</li><li>Drivers support Windows 2K, XP 32/64-bit, Vista 32/ 64-bit, and Windows 7.</li><li>High speed USB 2.0 interface</li><li>RoHS compliant</li><li>Integrated antenna</li><li>Support X-link global networking gaming</li><li>Interoperability, driver backward compatibility</li></ul>
2	Basic Features	
	Radio Type	<ul style="list-style-type: none"><li>Operation at 2.4 ~ 2.5GHz frequency band</li><li>Compatible with IEEE 802.11n standard to provide up to 150Mbps</li></ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		data rate. <ul style="list-style-type: none"> <li>Compatible with IEEE 802.11g standard to provide up to wireless 54Mbps data rate</li> <li>Compatible with IEEE 802.11b standard to provide up to wireless 11Mbps data rate</li> </ul>
3	Modulation	<ul style="list-style-type: none"> <li>IEEE 802.11b:- DQPSK, DBPSK, DSSS, and CCK</li> <li>IEEE 802.11g:- BPSK, QPSK, 16QAM, 64QAM, and OFDM</li> <li>IEEE 802.11n:- BPSK, QPSK, 16QAM, 64QAM with OFDM</li> </ul>
4	Security	<ul style="list-style-type: none"> <li>64/128-bit WEP data encryption</li> <li>Wi-Fi Protected Access (WPA/WPA2-PSK, WPA/WPA2-EAP)</li> </ul>
5	Network Protocol and Standards	<ul style="list-style-type: none"> <li>IEEE 802.11n</li> <li>IEEE 802.11g</li> <li>IEEE 802.11b</li> <li>USB 2.0</li> </ul>
6	Power Characteristics	OPERATING VOLTAGE 5 V DC +/- 5%
7	Environmental Specifications	<ul style="list-style-type: none"> <li>OPERATING TEMP:- 0 °C to 40 °C</li> <li>OPERATING HUMIDITY:-Up to 90%</li> </ul>
8	Certifications	<ul style="list-style-type: none"> <li>CE, FCC</li> </ul>

**62. Wireless N150 USB Adapter:**

**SME 124893**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	Basic Features	<ul style="list-style-type: none"> <li>Compatible with IEEE 802.11n standard to provide up to 150Mbps data rate.</li> <li>Compatible with IEEE 802.11g standard to provide up to wireless 54Mbps data rate</li> <li>Compatible with IEEE 802.11b standard to provide up to wireless 11Mbps data rate</li> <li>Operation at 2.4 ~ 2.5GHz frequency band to meet worldwide regulations</li> <li>Dynamic date rate scaling at 6, 9, 12, 18, 24, 36, 48, 54 for IEEE 802.11g.</li> <li>Dynamic date rate scaling at 1, 2, 5.5, and 11Mbps for IEEE 802.11b</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>Maximum reliability, throughput and connectivity with automatic data rate switching</li> <li>Support infrastructure networks via Access Point and ad-hoc network via peer-to-peer communication</li> <li>Drivers support Windows 2K, XP 32/64-bit, Vista 32/ 64-bit, and Windows 7.</li> <li>Support external WPS button to connect Access Point easily</li> <li>High speed USB 2.0 interface</li> <li>RoHS compliant</li> <li>Integrated antenna</li> </ul>
2	Radio Type	<ul style="list-style-type: none"> <li>Operation at 2.4 ~ 2.5GHz frequency band</li> <li>Compatible with IEEE 802.11n standard to provide up to 150Mbps data rate.</li> <li>Compatible with IEEE 802.11g standard to provide up to wireless 54Mbps data rate</li> <li>Compatible with IEEE 802.11b standard to provide up to wireless 11Mbps data rate</li> </ul>
3	Modulation	<ul style="list-style-type: none"> <li>IEEE 802.11b :- DQPSK, DBPSK, DSSS, and CCK</li> <li>IEEE 802.11g:- BPSK, QPSK, 16QAM, 64QAM, and OFDM</li> <li>IEEE 802.11n :- BPSK, QPSK, 16QAM, 64QAM with OFDM</li> </ul>
4	Security	<ul style="list-style-type: none"> <li>64/128-bit WEP data encryption</li> <li>Wi-Fi Protected Access (WPA &amp; WPA2)</li> </ul>
5	Network Protocol and Standards	<ul style="list-style-type: none"> <li>IEEE 802.11n</li> <li>IEEE 802.11g</li> <li>IEEE 802.11b</li> <li>USB 2.0</li> </ul>
6	Power Characteristics	<ul style="list-style-type: none"> <li>OPERATING VOLT AGE 5 V DC +/- 5%</li> </ul>
7	Environmental Specifications	<ul style="list-style-type: none"> <li>OPERATING TEMP:- 0 °C to 40 °C</li> <li>OPERATING HUMIDITY:-Up to 90%</li> </ul>
8	Certifications	<ul style="list-style-type: none"> <li>CE, FCC</li> </ul>

**OUTDOOR SWITCHES**

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**63. Outdoor Industrial Grade Switch:**

**SME 124894**

	<b>Model</b>	
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
<b>Sl. No.</b>	<b>Detail</b>	<b>Requirements</b>
1	These switches will be used for connecting cameras in the field. Minimum requirement is that it should be manageable Industrial Grade ruggedized switch (can be with enclosure meeting industrial grade requirement), minimum 8 POE+ 10/100Base TX ports from day one scalable up to 12 10/100 ports with dedicated 48 VDC power supply & additional 2 x 1G SFP combo ports from day 1. It should support all L2 functionalities along with SNMP & port level security. Should be IPV6 ready.	
	Switch should have non-blocking wire-speed architecture with support for both IPv4 & IPv6 from day one having switching fabric of minimum 8 Gbps or more with forwarding rate of minimum 6 Mpps	
	Switch should support Dual Power Supplies	
	Compliance Features: NEMA 5-15P / UL 60950 or IEC 60950 Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards EMC interface immunity: • IEC61000-4-2 • IEC61000-4-3/ENV50204 • IEC61000-4-4 EN 61000-6-4 :2007 (emission standard for industrial environments),EN 61000-6-2 :2005 (immunity standard for industrial environments) EN 55024: 1998 (Immunity Standards), IEC 61850-3 (Electric power Substations) – see details in table below IEC 62236-4:2008- Railway applications: Electromagnetic compatibility – Part 4 EN 50121-4:2006 for Class A device	
2	802.1Q VLAN on all ports with support for minimum 64 active VLANs & minimum 8k MAC address	
	Switch should support spanning tree protocol as per IEEE 802.1d & multiple spanning-tree protocol as per IEEE 802.1s. Rapid Spanning-Tree Protocol as per IEEE 802.1w or equivalent technology to avoid loop & delay	
	Should support Jumbo frames up to 9000 bytes & Link Aggregation Control Protocol (LACP) as per IEEE 802.3ad.	
	Switch should support IGMP v1/v2 as well as IGMP snooping	
3	Switch should support queuing as per IEEE 802.1P standard on all ports with mechanism for traffic shaping and rate-limiting features for specified Host, network, Applications etc.	
4	Switch should support access control list. RADIUS and TACACS+ for access restriction and authentication. Should support port level security.	
5	Should support loop prevention mechanism when BPDUs are received to avoid accidental topology loops with <= 20ms recovery time.	
	Switch should support DHCP Option 82	
6	Switch should be SNMP manageable with support for SNMP Version 1.2 and 3.	
7	Operating Temperature: 0 to 55°C	
	Operating relative humidity: Up to 90%	
	Switch with Protection Class - IP 20 with support for rack and wall mount options or with	



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	Enclosure of IP 20 certification.	
8	Certification : UL, CE & FCC	

**Distribution Switch****64. 10G Distribution Switch:**

Sl. No.	Detail	Requirements
	<b>Make</b>	<b>Pl specify</b>
	<b>Model</b>	<b>Pl specify</b>
	<b>Manufacturer's Authorization</b>	<b>Attachment file name.....</b>
	<b>Technical Literature/Brochure</b>	<b>Attachment file name.....</b>
1	L2 Features	<ul style="list-style-type: none"> <li>• RJ-45 Ethernet for out-of-band remote management</li> <li>• Switch shall have Non-blocking wire speed switch fabric</li> <li>• The Switch shall support IPv4/IPv6 Routing including IPv6 Tunnel, ICMPv6, IPv6 Neighbour Discovery(ND), DHCPv6, RIPng and OSPFv3</li> <li>• Switch shall Attain up to 480G stacking bandwidth with four devices functioning together as one</li> <li>• The Switch should have RIPv1(RFC1058)/RIPv2(RFC2453),RIPng,OSPFv2, OSPFv3, MPLS,MPLS L3 VPN, VPLS, VRF-lite or equivalent from day 1</li> <li>• The Switch should have Policy Based Routing ,BGP 4 &amp; VRRP</li> <li>• Switch should have DVMRP v3, PIM-DM/SM/SDM for IPv4</li> <li>• Switch should have IPv6 Tunnelling</li> <li>• The Switch should have Up to 256 IP Interfaces &amp; 1K route entries or more</li> <li>• The Switch should have Multi Path Routing support for Equal cost &amp; Weighted Cost Supports Equal Cost/Weighted Cost multi-path route</li> <li>• The Switch should have IGMP Snooping v1,v2,v3 &amp; MLD Snooping</li> <li>• The Switch should have Spanning tree 802.1d,802.1w,802.1s</li> <li>• Switch should have 802.3AX Link Aggregation Max. 16 groups per device, 12 ports per group</li> <li>• Switch should have Port Mirroring One to one/Many to One &amp; RSPAN</li> <li>• Switch shall have the intelligence to detect the loop occurring from the unmanaged network segment</li> <li>• Switch shall have the capability to build the trunk across stack</li> <li>• Switch shall support IEEE 802.3ah, IEEE 802.1ag, 802.1AX &amp; ITU-T Y.1731</li> <li>• It shall support LLDP and LLDP-MED including client location information. It shall exchange link and device information in multi-vendor networks</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

2	MAC Address	128K or higher
3	Flash Memory:	1GB NAND Flash, 4MB NOR Flash or higher
4	DRAM size	2GB
5	Packet Buffer	9 MB or higher
6	Jumbo Frame	12k bytes or higher
7	VLAN	<p>The LAN switch should have IEEE 802.1Q VLAN encapsulation. Max. 4K static VLAN groups</p> <p>Max. 4094 VIDs</p> <ul style="list-style-type: none"> <li>It shall have Automatic Negotiation of Trunking Protocol, to help minimize the configuration &amp; errors</li> <li>Switch should have centralized VLAN Management. VLANs created on the Core Switches should be propagated to all the others switches automatically, thus reducing the overhead of creating/modifying/deleting VLANs in all the switches in turn eliminating the configuration errors &amp; troubleshooting.</li> <li>It should have support for Detection of Unidirectional links and to disable them to avoid problems such as spanning tree loops</li> <li>It shall support 802.1v &amp; Q-in-Q VLAN, Guest VLAN</li> </ul>
8	QoS	<ul style="list-style-type: none"> <li>It should support 802.1p Priority Queues (8 Queues)</li> <li>Queue Handling mode: WRR &amp; Strict Mode</li> <li>Switch shall support three color marker with CIR/PIR minimum granularity of 1 kbps</li> <li>Class of service should be based on Switch port, DSCP, VLAN ID, TCP/UDP port, Protocol type, 802.1p queues, IPv4/v6 address, IPv6 flow label &amp; User defined packet content</li> </ul>
9	ACL	<ul style="list-style-type: none"> <li>The LAN Switch shall have the capability to apply access list control based on IPv4/v6 address, Protocol type, IPv6 flow label, Time based ACL, VLAN-ID, MAC-ID, DSCP, IPv6 traffic class, TCP/UDP Port, Switch port &amp; user defined packet content</li> <li>Switch shall support up to Max. ACL entries: 1792 ingress ACL rules 1K egress ACL rules 1K VLAN ACL rules</li> </ul>
10	Security	<ul style="list-style-type: none"> <li>The LAN switch shall support IEEE 802.1x to allow dynamic, port-based security, providing user authentication</li> <li>Switch shall support for Admission Control features to improve the network's ability to automatically identify, prevent and respond to security threats and also to enable the switches to collaborate with third-party such as Microsoft for security-policy compliance and enforcement before a host is permitted to access the network</li> <li>Microsoft NAP support Support IPv4 Support IPv6 Support 802.1X NAP Support DHCP NAP</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>It shall support for SSHv1/1.5/2, SNMPv3 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions</li> <li>It shall support RADIUS authentication to enable centralized control of the switch and restrict unauthorized users from altering the configuration.</li> <li>It shall support DHCP snooping to allow administrators to ensure consistent mapping of IP to MAC addresses. This can be used to prevent attacks that attempt to poison the DHCP binding database, and to rate limit the amount of DHCP traffic that enters a switch port</li> <li>It shall support DHCP Interface Tracker (Option 82) to augment a host IP address request with the switch port ID.</li> <li>It shall support that each end node can be isolated from each other and they should be able to connect to shared ports such as Internet and servers</li> <li>It shall support port security to secure the access to an access or trunk port based on MAC address. After a specific timeframe, the aging feature should remove the MAC address from the switch to allow another device to connect to the same port.(up to 14 MAC-ID per port)</li> <li>It shall have IP-MAC-Port binding up to 475 Entries per device</li> <li>It shall have CPU Filtering to protect the CPU from Broadcast / Multicast / Unicast flooding &amp; protocol control packets attacks</li> </ul>
12	Certification	UL, CE, FCC & VCCI,
15	Warranty	3 Years

**65. 10G Distribution Switch as per above specifications and its accessories.**

Sl. No.		Requirements
1	<b>SME 124895</b>	8 SFP+ ports with one expansion module with 480 Gbps Switching capacity & 357 Mpps forwarding rate
2	<b>SME 124896</b>	24 SFP+ ports with one expansion module with 960 Gbps Switching capacity & 710 Mpps forwarding rate
3	<b>SME 124897</b>	Fan tray with front to back air-flow
4	<b>SME 124898</b>	AC power supply as required in above switch with front-to-back airflow
5	<b>SME 124899</b>	Stacking Module
6	<b>SME 1248100</b>	4 x 40Gbps QSFP+ module
7	<b>SME 1248101</b>	4 x 10GBASE-T module
8	<b>SME 1248102</b>	8 x 10G SFP+ module

**66. Video Management System with Analytics as per above specs – Enterprise Version**

Sl. No.		Requirements
1	<b>SME 1248103</b>	VMS - License Per camera
1	<b>SME 1248104</b>	VMS - Base License
2	<b>SME 1248105</b>	VMS Live View Only
3	<b>SME 1248106</b>	VMS Live View + Recording + Redundancy
4	<b>SME 1248107</b>	VMS Additional User License
5	<b>SME 1248108</b>	VMS Multi Monitor Wall
6	<b>SME 1248109</b>	VMS Failover License
7	<b>SME 1248110</b>	AMC

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**67. Video Management System with Video Analytic Feature as per above specs:**

Sl. No.		Requirements
1	<b>SME 1248111</b>	Video Tamper & Video Motion per camera with Search Capability
2	<b>SME 1248112</b>	Perimeter Intrusion with Search Capability
3	<b>SME 1248113</b>	Loitering with Search Capability
4	<b>SME 1248114</b>	Left Object with Search Capability
5	<b>SME 1248115</b>	Traffic Analytics @ Violation with Search Capability
6	<b>SME 1248116</b>	Enterprise License ( All Rules ) with Search Capability
7	<b>SME 1248117</b>	Search Capability

**68. ANPR System**

**SME 1248118**

**Automatic License Plate Recognition System**

**INTRODUCTION**

The Contractor shall design, supply and install an outdoor IP based Automatic License Plate Recognition system which captures the vehicle images, detects and process the license plate and provides the license plate number.

**SYSTEM DESCRIPTION**

***Automatic License Plate Recognition System***

- The system shall be high resolution IP camera based with environmental housing for outdoor road side operation.
- The System should be able to detect a vehicle approaching or leaving the designated location even at speeds up to 100kmph.
- The system should be able to configure for capturing vehicle front or back license plate accurately.
- The system should be able to support capturing of vehicle license plates up to four lanes simultaneously.
- The system should have robust vehicle detection technology to avoid any sort of false triggers caused due to motion other than vehicles.
- The system should be compatible to capture images of its License Plate & optionally the vehicle, Driver images and store in central database.
- System should be able to detect license plate within an image irrespective of its position, skew & size accurately.
- System should Perform OCR [Optical Character Recognition] for the standard license number plate (only English alpha numeric plates) of vehicles entering or leaving from the designated locations.
- System should be able detect accurately any non standardized license plate ( not as per Indian RTO standards such as, Different fonts, size, special characters, etc) & extract portion of the license plate image & store to the central database.
- System should be able to detect and recognize the English alpha numeric License plates of two wheelers or four wheelers & above.
- The system processing should be able to detect & recognize all vehicle license plates in

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

<p>real time.</p> <ul style="list-style-type: none"> <li>• The system should be able to detect &amp; recognize all vehicle license plates in single or dual row.</li> <li>• The system should be able to capture multiple images per vehicle and select the best result.</li> <li>• The system shall provide the validation algorithm to detect the number from multiple snaps.</li> <li>• System is robust to variation in License Plates in terms of font, size, contrast and color and should work with reasonable accuracy.</li> <li>• The system should support customization of vehicle license plates to different formats for each type of plate (eg. 6Char or 8Char per license plate).</li> <li>• The system should be able generate real time alarms to alert the control room for vehicles which have been marked as “wanted”, “Suspicious”, “Stolen”, “Expired” upon successful recognition of the number plate. [These categories can be added and expanded as per customer requirement].</li> <li>• The system should have required interface to support vehicle access barriers to prevent any escape of “wanted”, “Suspicious”, “Stolen”, “Expired” vehicles.</li> <li>• The system should be able to overlay data such as Lane info, Junction details, Time stamp, etc on to the License plate image for storing into central database.</li> <li>• System should provide an option for advanced users to tune the system parameters according to the location.</li> <li>• The system should be able to work seamlessly with wired or wireless networks.</li> <li>• The system should support digital water marking of captured images to avoid any sort of tampering &amp; automatically sent to command control back office server via wired or wireless networks.</li> <li>• The system should support real time status update to central command control.</li> <li>• The System should work in both day and night conditions even at pitch dark.</li> <li>• The system should enable easy and quick retrieval of license plate image / data for post incident analysis and investigations.</li> <li>• The back office server software should support license plate data mining &amp; generate suitable reports that will provide meaningful data to concerned authorities.</li> <li>• The system design should be based on scalable open architecture platform for seamless integration with similar surveillance systems in use or likely to be used by the customer.</li> <li>• The system support users with different access types.</li> <li>• The system should manage the vehicle search list and be able to upload to all the clients from centrally.</li> <li>• The System should support interface to control boom barrier optionally.</li> <li>• The system should be rugged &amp; be able to work under all weather conditions.</li> <li>• The system should have built-in Normal, HD video recording capability.</li> <li>• The system should have option to clip &amp; associate a pre &amp; post recording of a license plate capture as per the defined time interval by the user.</li> <li>• The system should support license plate recognition under free flow traffic with or</li> </ul>	
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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

without induction loops support for vehicle detection. <ul style="list-style-type: none"> <li>The system should support client server architecture to have multiple ALPR view stations at different location.</li> <li>The System should be based on client server architecture and the servers should be placed in the control room. There should be no field equipment except cameras and UPS for support.</li> <li>Should have inbuilt VMS functionality in software for recording Auxiliary cameras and should have functionality to integrate to UVSS at critical locations</li> </ul>	
<b>The camera should have following minimum specification</b>	

Camera Interface	IP
Resolution	2.0Mpxl
Shutter Speed	1/50 – to 1/10000 or better
Operating Temperature	0 deg c to +45 deg c
Frame Rate	25/30 fps
Varifocal Lens	5 – 50 mm or better
Electronic Iris Control	DC Type
Mount	C/CS
Image Format	¼, 1/3, ½
Wavelength	850nm ( Semi Covert )
IR Illuminator	Suitable for capture of number plates in night conditions up to 50 meters
Environment Protection	IP65/IP66
Filter	IR Filter
Camera Housing Protection	IP65/IP66
Speed Limit	40Km/Hr
Installation & Mounting	Pole Mounted
Integration	Should be capable of integration with overall architecture of Surveillance

**69. Face Recognition System (FRS)****SME 1248119**

<b>Technical Specifications Facial Recognition System (FRS)</b>
<b>Overall Requirement</b>
The facial recognition solution targeted by this specification must be able to identify multiple persons of interest in real-time, through leading-edge face recognition technology. Concretely, the system must be able to recognize subjects appearing simultaneously in multiple live video streams retrieved from IP surveillance cameras. The Facial recognition system should seamlessly be integrated to the network video recorders and the video management system.
<b>Design and environmental considerations</b>
<ul style="list-style-type: none"> <li>It is acknowledged that biometric identification through a video surveillance medium presents a variety of challenges that might affect the success of the solution. Some of the identified factors are listed below:</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

- Subjects being occluded from the cameras (by hats, caps, scarves, glasses, beards),
- Non-optimized ambient conditions (challenging lighting, incorrect camera locations,
- wrong camera configuration),
- Gallery images of the subjects not meeting the necessary quality standards.
- These issues may negatively impact the final recognition rates. In order to minimize the potential of this occurring, significant time has been spent considering the necessary features of the software solution, and the specific requirements for the camera installation. The installer will need to commit sufficient time to optimize the camera locations. For each location, the best combination of camera, lens, and mounting brackets will be chosen to ensure that the obtained image quality and face pose deviation are within the recommended parameters. The main guidelines to be considered towards this end are further detailed below.
- Given that facial recognition technology, in such being a biometrics cannot be 100% accurate, a clear and objective statement of the expected performance for the fully installed and well-tuned system is laid out below.

**Installation planning**

The resulting architecture may consist of either a single, stand-alone facial recognition station

Or multiple interconnected stations. The final number of stations depends on the estimated

Computational requirements and on logistic considerations about the surveilled site.

Each station will consist of a server connected to a certain number of IP cameras by means of a dedicated local area network. In order to minimize costs, the minimum number of servers will be devised to undertake all the operations required, from the acquisition of images to the recording of events in the database. Particular tasks may be relied to additional machines if deemed appropriate.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

<b>Licensing</b>
The licensing of the project will be conducted on a per-camera basis.
<b>System performance objectives</b>
The performance of the devised facial recognition solution will be evaluated in terms of accuracy and computational efficiency.
<b>Accuracy</b>
<p>A fundamental trait of biometric systems is their accuracy performance. Such measures are very difficult to evaluate in real-life video surveillance installations, given the impracticality to obtain annotated ground truth from long testing periods of video recorded in a large variety of situations. For that reason, commercial systems are usually evaluated using standard</p> <p>Verification protocols from still image databases, such as the well-known FERET and XM2VTS datasets.</p> <p>Two of the most widely used measures to evaluate biometric systems are the Match Rate and the False Positive Rate. The first one refers to the percentage of times that the system raises an identification event when presented a sufficiently good image of a subject that has been enrolled. The second one is the proportion of incorrect events raised over the total, which originate from the system perceiving two different persons as equal. As a guideline, the facial recognition software should provide Match Rates of at least 85% and False Positive Rates</p> <p>Below 3%, when operating under a controlled environment. Accurate face recognition systems must be robust against changes due to gestures, head poses, occlusions, or lighting, among others.</p>
<b>Computational performance</b>
<p>Although much attention is given to accuracy, it is also of great importance that the targeted system controls several video streams without efficiency loss, processes multiple faces at high speeds, and notifies the raising of events instantaneously. In open and crowded environments like the one described in this specification, where subjects may appear in front of a camera for just a fraction of a second, slower alternatives working at lower frame rates would be at risk of missing the opportunity to identify potential targets.</p> <p>Recent developments in face recognition advice for the use of GPU technology instead of</p> <p>Traditional CPUs, to greatly improve the computational performance in crowded environments.</p> <p>These systems dramatically increase traditional frame rates, especially at high resolutions, and also enhance the scalability of the deployed solutions. Therefore, it is strongly recommended that the targeted solution features GPU technology if a large number of simultaneous faces is expected to appear in the recorded locations.</p> <p>As a guideline, the targeted solution must be able to reach 200 processed frames per second on a single camera with the use of GPUs at a resolution of 1080p, and 75 FPS at resolutions of 4K. In case CPUs are thought to cover the stated requirements for the solution, the minimum performance will be 10 FPS for multiple streams and multiple faces. The generation of events should take place within 1 second of the reception of the frame, for at least 90% of the total number of generated events.</p>
<b>Generic requirements</b>
<p>The targeted face recognition solution must be able to continuously detect and recognize faces of enrolled subjects from IP video surveillance cameras, at a distance, on the move, and</p> <p>Without requiring any collaboration from the subjects to be identified. Such solution should not require continuous monitoring by human operators, and must provide a comprehensive user interface to easily and swiftly access the collection of events registered by the system.</p> <p>Given the large influx of people at the site, it is mandatory that the solution is capable of simultaneously recognizing multiple faces in each video stream, that each server controls more than one camera at the same time, and that the simultaneous processing of all video streams is accomplished at a</p>



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

minimum frame rate, so as not to miss opportunities for identification. As a guideline, each server should be able to either process up to 6 cameras at the same time, or identify 20 faces simultaneously, without a speed loss that could significantly compromise the system performance.

The facial recognition solution must be deployable over existing IP CCTV camera systems, as long as those comply with the quality standards specified in this document. It must as well support a variety of well-recognized camera manufacturers.

### **Biometric characteristics**

As in any other biometric system, the face recognition software should incorporate an adjustable identification score threshold to set the probability of a match, and such control must be accessible to the operators. Moreover, it must be possible to adjust this threshold during the application runtime, without pausing nor discontinuing the identification process.

Technical advice will be required towards the configuration of this and other parameters that may have an impact in the successful performance of the solution.

Face images captured by the camera system are naturally prone to variability with regard to the reference images enrolled in subject galleries. The face recognition software and its biometric algorithms must be able to deal with the following sources of error:

- Changes in facial expression.
- Changes in beard and hairstyle.
- Changes due to moderate aging.
- Partial occlusions of the face, such as hats, scarves, caps, glasses or sunglasses.
- Variations in lighting conditions, and ambient illumination down to 1 LUX.
- Head pose deviations up to  $\pm 35^\circ$  horizontally, and  $\pm 25^\circ$  vertically.

Regarding head pose variability, the solution must incorporate 3D modeling technology to either artificially compensate head pose orientations in captured images, or generate novel views in reference images for the enhancement of biometric models. The use of this technology should by no means represent a significant loss of efficiency in the global performance of the solution.

### **Event management**

The deployed facial recognition solution must incorporate a series of event management functionalities. These will allow the operator to define how detection and identification events are notified and stored, and will facilitate as well the inspection of such events.

The face recognition software must report both detection and identification events in real-time. As a guideline, such events should be incorporated into the database within one second since the reception of the corresponding frame by the video server, for at least 90% of the generated events.

Event logs should contain mandatory information such as the identity of the subject (ID or full name), the timestamp corresponding to the complete date and time in which the event was raised, the camera from which the subject was identified, and a snapshot depicting the face identified by the facial recognition software, for further inspection. Desirably, each event should also record the complete frame that originated the event, in order to better understand the context of the recorded action. The software must allow operators to search, filter, and sort the collection of reported events by a series of criteria, such as date and time of the event, identification scores, identity information about the recognized subjects, or origin from a particular camera. This information retrieval process should be possible during runtime, without pausing, discontinuing, nor compromising the performance of the identification process. The software should also permit operators to import / export the list of events between databases, and also export the list of events to common formats such as PDF and Microsoft Excel.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

The software must allow basic alerting functionalities such as sound triggering, in order to attract the attention of the operators. Another mandatory functionality is to send the generated events in real-time to external portable devices, such as smartphones or tablets.

Occasionally, due to the challenging conditions during image acquisition, a detected subject may be similar to more than one of the enrolled gallery subjects. In that case, the software must provide a list of the top matching candidates (at least 5, but this number should be configurable), sorted by identification score.

Finally, the software should allow periodical purging of the event records, at a configurable periodicity to be specified by the operators. This has a twofold purpose: first, to comply with the privacy limitations imposed by certain legislations; and second, to free disk resources from large storage files, due to continuous recording of events in crowded scenarios.

#### **Gallery management**

The main purpose of the gallery is to organize the subjects that have been enrolled into the system, and manage their personal information, their reference image samples made available to the system towards their further identification, and their assigned security level. This last attribute will be achieved by assigning them to a number of watchlists (at least, blacklists for potential offenders and whitelists for relevant personalities). Operators must be able to edit the watchlist assignment of a subject during the application runtime.

Subjects must be automatically enrollable from one or more photos or videos. The maximum number of facial snapshots for a gallery subject should be configurable. Additionally, the software must allow operators to pick one of the facial images as the profile image representing such subject. It is understood that the enrolment operation is crucial for the success of facial recognition algorithms, so the quality standards of enrolment images will be higher than those of images captured by the cameras. More explicit recommendations are given below. For the same reason, it is considered important that the operators are capable to ultimately select which image samples will be used for identification, and which ones are not suitable. To this end, it is absolutely necessary that the face recognition software provides a measure of quality for the images to be enrolled, so as to guide and automatize the enrolment operation. It is also necessary that the software provides means to automatically enroll subjects from large collections of external images, either stored in a single directory or classified in directory structures.

Since image samples are not always available for the subjects, it is fundamental that the software permits operators to directly enroll subjects from detection events, in order to identify these subjects in subsequent apparitions. Furthermore, it is highly desirable that the solution is able to automatically enroll all subjects that are being observed in the cameras at any time, without operator collaboration. We are conscious that this would generate a large amount of event records, putting at risk the disk space resources of the servers, so this functionality would also demand periodical database purging.

Galleries should have a capacity of hundreds (and desirably thousands) of subjects to be

enrolled. Galleries must be exportable to other system installations. In the case of distributed stations, the facial recognition solution must be able to automatically replicate and redistribute the galleries of a central station among the rest of stations.

#### **System integration, extension and centralization**

The facial recognition software must facilitate its integration into existing infrastructures, such as Video Management Systems or Access Controls. Moreover, it should be open to further integration opportunities, enabling external integrators to incorporate tailored software modifications or additions on demand. To this end, the targeted solution should incorporate an API, SDK or software library including a collection of specifications that aim to ease the work of present and future software integrations and enhancements.

The solution must be easily extensible at any time, by allowing on-the-fly incorporation of new cameras and stations, not requiring any specific software upgrades for that purpose. The system must be able to work as a stand-alone solution, but also facilitate the connection of stations at geographically distant locations through a distributed client / server architecture.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

When choosing a distributed architecture, the system must be able to completely centralize the events and galleries from each local station into a unique central station, devoted to management and supervision.

#### **GUI and compatibility**

The Graphical User Interface of the facial recognition software is particularly important for the correct supervision and successful management of the deployed solution by the assigned operators. It must allow for the following functionalities:

- Monitoring of camera video streams at all times, both as a whole and individually.
- Straightforward visualization and search of detection and identification events, enabling close-up inspection of the facial snapshots captured by the solution.
- Fast editing of subject details and permissions during application runtime, such as their belonging to specific watchlists.

The GUI must support at least English language for all kinds of textual information displayed to the operators.

#### **Image format support**

The facial recognition software must allow the enrolment of subjects from standard image formats, such as JPEG, PNG or BMP. In all cases, the images to be enrolled shall comply with a minimum standard of quality, as below :

Identification : 35 Pixels Minimum & 50 pixels maximum

Enrollment :: 50 Pixels Minimum & 75 pixels maximum

#### **Video format support**

The targeted solution must be able to stream video directly from an IP camera. Additionally, it should also provide means for its integration into an existing Video Management System. It must comply with MJPEG, H.264, RTSP, and HTTP (snapshot) protocols for the acquisition of video streams or image frames. The software must also allow the enrolment of subjects from standard video formats, such as AVI, MPEG2, MPEG4, MOV or MKV.

#### **Database Requirement**

The software should register raised events in relational databases complying with the SQL standard, such as PostgreSQL, Oracle or MSSQL. The database should have a capacity for more than 500,000 identification events.

#### **Camera system specifications**

The quality of the images provided by the video surveillance system plays a fundamental role in the resulting recognition rate. The solution should incorporate Megapixel IP cameras with a resolution of at least 1 MP (720p). In general, analog cameras are not recommended due to quality limitations, and particularly, interlacing must be always avoided in order to optimize the video transmission throughput. IP cameras must have a CCD image sensor size of at least 1/2", and frame (global) shutter instead of rolling shutter, in order to avoid the presence of motion blur. The cameras should provide a frame rate of at least 15 FPS.

The chosen IP cameras should preferably incorporate functions for automatic white balance and backlight compensation, in order to deal better with challenging environmental lighting conditions. The supported video encoding should be H.264 or MJPEG (preferably both).

The choice of a lens also plays a decisive role in the final quality of the images sent to the facial recognition system. Concretely, only those faces captured within a specific distance range will be in focus, and thus suitable for recognition. Typically, faces to be recognized will appear at distances that range between 2 and 20 meters, depending on the considered camera location. As a result, suitable lenses (either fixed or variable) will normally take focal length values between 5 and 50 mm, respectively. The final focal length value will

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

depend on the exact camera location and its frame resolution, and should be computed for each camera following the recommendations in Section 3.

In order to increase stability and performance, and facilitate the incorporation of multiple simultaneous cameras, Ethernet connections will be chosen over USB for connecting the cameras to the server. This will also reduce limitations regarding the maximum cable length.

Dedicated Gigabit networks are highly recommended. Cameras will be preferably PoE (powered over the Ethernet), and PoE injectors will be used whenever necessary.

**Reference and captured image quality**

It is essential that the reference images used within the face recognition solution are high quality and conform to the prescribed standard. Images must be sharp (not blurry) and of high resolution. Color information is not a requirement for face recognition, so grayscale images of at least 8 bits (256 gray values) are possible. Since face sizes may vary from one person to another, face resolutions are typically estimated by measuring the distance between the center of the eyes (interocular distance), in pixels.

Quality standards differ depending on whether the image will be used as a reference image (for enrolment) or is captured by the cameras (for identification). Enrolment images should comply with a higher standard of quality, for the biometric models will be created from them.

Reference images for enrolment should have a minimum interocular distance of 50 pixels, whereas 75 pixels are desirable for optimal performance.

On the other hand, successful identification should be possible starting from 35 pixels between the eyes of captured facial images. It is acknowledged that higher resolutions in the retrieved frames will result in better recognition performance, so 50 pixels between the eyes are highly

encouraged. It is worth noting that excessive resolutions could also have a negative impact in the computational efficiency of the solution, so a proper adjustment of the cameras will be crucial for achieving a correct tradeoff.

Resolution is not the only factor that diminishes the quality of an image for face recognition. Other circumstances that should be strictly avoided whenever possible are occlusions, blurring, adverse lighting and excessive shadows, being out of focus, and lack of frontality.

**Camera mounting and configuration**

In order to ensure a successful identification, the mounting of the IP cameras must globally optimize a number of ambient conditions. First, it should grant suitable illumination conditions: enough lighting, global illumination preferred to directed lights, to avoid the presence of shadows, and lack of strong backlights that would darken the acquired images. Secondly, the horizontal orientation of the camera should meet the most usual walking direction of the subjects, so as to avoid lateral faces. This can be achieved by pointing at entrances, or across corridors, for instance.

From a facial recognition perspective, a camera would be optimally located in front of the face to be recognized, at a height equal to the eye level of an average sized person (about 1.65 m).

Although this practice is convenient in the case of facial access controls, it would originate constant occlusions when the subjects of interest are far away, as it is the case for video surveillance applications. As a result, surveillance cameras are typically mounted in higher locations in order to cover a larger area and avoid unwanted occlusions, thus introducing a systematic vertical pose deviation between the camera and each analyzed face. Face recognition systems acknowledge this deviation, but are not invariant to it, so the camera angle with respect to the horizontal should be minimized. As a guideline, the vertical camera angle should always be less than 15°.

The selection of camera lenses is also very important. Correctly configured IP cameras will only provide clear focus to objects at a specific distance range. The original lenses of IP 12 cameras may be insufficient to achieve clear focus at long distances, and in this case an appropriate extra lens may be required. An example of lens calculation would be as follows:

optimal resolution involves 50 pixels between the eyes, and this distance can be considered around 6 cm, which results in a demand of 833 pixels / meter. At 20 meters distance, this would represent a lens of around 65 mm for frame resolutions of 720p, or 46 mm for 1080p.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**70. Tower With Lightning Arrester Per Meter (6 meter Basic Height) - SME 1248120****71. Pole With Surge Protector Per Meter (6 meter Basic Height) - SME 1248121**

<b>Technical Specifications for 6M POLE/ Mast</b>			
<b>Sr.No.</b>	<b>Functionality/ Description</b>	<b>Minimum Specifications</b>	<b>Bidder's Response (Yes/No) with details</b>
1	Make		
2	Product code/model	Bidder to specify	
3	pole detail	Free Standing, Polygonal (Min 8 sided) continuously Tapered.	
4	Height of High Mast	6M	
5	<b>Weight</b>	<b>Bidder to specify</b>	
6	Size of Pole	Bidder to specify (Min. Top-70 mm, Bottom-130 mm, Thks-3mm)	
7	Base plate	Bidder to specify (Min. 200X200X12mm)	
8	Anchor Plate	Depending on Base plate, Min 200 PCD	
9	No. of longitudinal weld	1 (No circumferential weld is allowed)	
10	Joint	Single section, no joint required	
11	Type of locking arrangement and door construction	The door shall be close fitting, dust proof, vermin proof and weather protected (IP54) and shall have suitable locking arrangement	
12	Material of construction (Shaft)	High Tensile Steel BSEN 10025 or Equivalent	
13	Material of construction (Base Plate)	IS 2062 or Equivalent	
14	Metal Protection Treatment for Monopole	Hot dip galvanized, single dip, inside & outside confirming BSEN ISO 1461	
15	Galvanization Thickness	Min 86 Microns as per BSEN ISO 1461	
16	Max design windspeed	180 km/hr with 3-second gust as laid down by IS:875/1987 Part III	
17	Type of foundation	Isolated step footing RCC (M-20)	
18	Size of foundation	As per design and site condition confirming to IS:456	
19	Foundation Bolts (4nos.)	Min. M16X600mm 'J' type EN 8 grade foundation bolts along with template	
20	Nuts and Washers	Heavy duty galvanised. Lock nuts to be provided	
21	Surge protector/Lightning Arrester		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**72. USB Joystick with Hall Effect designed to provide network video controlling with responsive and accurate PTZ camera control and should be integrated with above used camera's & surveillance software -****SME 1248122****73. Desktop Geographic Information System (GIS)****SME 1248123**

<b>Data Compliance</b>	
(a)	OGC Compliant and integrates with other OGC Compliant GIS products which are available in the Software Market.
(b)	Developed on OGC and ISO concepts for describing and delivering data and built on a 'Service Oriented Architecture' (SOA).
(c)	OGC Compliance Certificates for the following:
	i . WMS – Web Map Service
	i i . WCS – Web Coverage Service
	i i i . WFS – Web Feature Service
	i v . WFS-T – Web Feature Service (Transactional)
(d)	Supports standard raster and vector formats available in the market and those promulgated by Survey of India and ADG Military Survey for distributing data.
(e)	The application software provides all common modern features including the following:
	I. Support for 3D stereo viewing with compatible hardware
	ii. Support for multi-touch user interface
	iii. Support for 3D globe view
	iv. Support for customizations of graphical user interface as per user requirements
	v. Support for stereoscopic 3D across a multi-channel display with acceptable frame rate.
<b>Data Formats</b>	
(a)	Topographical maps (from any source) in Vector/Raster format with auto seamless display of varying scales.
(b)	Support for following raster data formats:
	i. Native Geo-tagged formats including – GeoTIFF, TIFF, BigTIFF, HDF5, Multi-band GeoTIFF and DTED
	ii. Popular Non Geo-tagged Formats – JPEG, BMP and PNG (software allows specifying extents)
	iii. Data available through services – WMS and TMS
(c)	Support for following vector data formats:
	i. Geotagged data formats including Shape file, DGN (V7 and V8), KML & GML including metadata
	ii. Popular GPS data formats including .gpx
	iii. Data available through services – WFS
(d)	Support for following data resolutions:
	i. Raster maps of resolution upto 50 cm or better
	ii. Satellite imagery with bit-depth of more than 8 bits (10, 12 and 16 bits)
	iii. DTED data of resolution upto 2 m or better
(e)	Support for following 3D model data formats:
	i. COLLADA Model file (*.dae)
	ii. GeoVRML
(f)	Support for importing CAMS provided DGN data (with / without Oracle Dump) to native GIS format. Has capability to pre-process CAMS data.
	i. No loss of data in conversion.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	ii. No inaccuracies result from the conversion process
	iii. Maintains color scheme of DGN entities when converting to native GIS formats
(g)	Support for loading and displaying UAV video clip with geo-referencing data
(h)	Support for popular video formats including AVI and MPEG
(i)	On the fly Coordinates System transformation.
(j)	Support for loading and displaying 2D and equivalent 3D military symbols
(k)	Facility to convert data vector layers and overlays to any standard GIS format (like SHP/DGN/Oracle/SQL Server) and vice versa along with related data with vector entities without using any middleware/ translator.
(l)	DGN, GWS, shape and GML files in a single map window and able to query/ filter across these seamlessly. User can edit (both spatial and attributes) layers if available in MS access, Oracle, SQL server, PostGIS and OGC WFS-T directly without use of any middleware technology.
<b><u>Map Display Support</u></b>	
(a)	Display of 3D coordinates under mouse cursor
	I. Latitude and Longitude in multiple modes-Degree, minutes & decimals [or degrees, minutes & seconds].
	II. Mil Grid Reference [8 characters alphanumeric, eg MT245369] based on Secondary coordinates Sys of DGN provided by CAMS without giving parameters from external source. Inaccuracies in GR readout on raster and vector maps are not acceptable. Able to handle maps of two adjacent grid zones without any errors in GR readout.
(b)	Interactive 2D map display with following
	I. Selected raster layers
	II. Selected vector layers
(c)	Interactive 3D terrain model display with following
	I. DEM Data displayed in 3D as terrain model
	II. Selected raster layers mapped on underlying elevation model
	III. Selected vector layers draped on underlying elevation model
	IV. 3D models positioned on top of elevation model similar to Google Earth
(d)	Varying light intensity and sun angle for the DTM view
(f)	Support for level-of-detail based display.
(g)	Support for full-screen map display mode by hiding all menus and other widgets
(h)	Facility to change transparency of individual raster layers making them semi-transparent so that multiple layers can be displayed simultaneously
(i)	Support for 3D stereo display of map and terrain data in following modes:
	I. Anaglyph stereo
	II. Active Stereo
	III. Side-by-side stereo
<b><u>Usability/Interface</u></b>	
(a)	Map data interaction with mouse, keyboard as well as touch gestures (if available on display)
(b)	Intuitive data navigation supporting pan, zoom, tilt, rotate using Google Earth like manipulators
(c)	Support for advanced 3D manipulators including Globe Navigator, Walk, Fly and Drive
(d)	Support to display list of raster, vector and analysis layers using a tree-like view
(e)	Support to toggle the display of individual layers directly using the tree view
(f)	Support for reordering the display of individual layers by dragging the layers to the desired position in the tree view
(g)	Support for GeoJump to a layer/element directly from the tree view by double-clicking on the element
(h)	Support for showing the view orientation using a digital compass widget displayed along with the map
(i)	Auto adjustment of size of polygons, lines and points on changing viewer position.
(j)	Interactive map sheets display with highlighting and display of map sheet number.
(k)	Interactive display of symbols and information retrieval on selection.
(l)	Support for storing local application state as a workspace and retrieving it later. Workspace feature supports:
	i. Storing any number of raster and vector layers loaded to create a mosaic of maps
	ii. Displaying list of stored workspaces and allowing user to select and load a workspace
	iii. Support to display minimum 4 recent workspaces on the top

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

<b><u>Overlay and Vector Editing Features</u></b>	
(a)	Facility to edit/add/delete vector entities in the base vector maps including any shape, DGN and KML layers
(b)	Facility to create point, multi-point, line, line-segment, filled and boundary polygon vectors
(c)	Facility to control the display style of vectors with user defined color, thickness, transparency, stippling and textures
(d)	Editable text with facility to change font and color of annotated text such as city name (Without making any changes in the base DGN data).
(e)	Grouping of created user layers.
(f)	Scale up / scale down facility to different scale maps for the same location.
(g)	User friendly method for creating layers.
(h)	Merger of two or more layers and save them as one.
<b><u>Symbology &amp; Annotations</u></b>	
(a)	Facility to annotate satellite image & DTM using available and user defined symbols.
(b)	Orientation of symbol maintained for all view angles in 3D.
(c)	Graphics drawing facilities to include manipulation of graphics and symbols (Save, Copy, Erase, Rotate, Resize, Delete etc.).
(d)	Text Annotation to be Draped on the raster image.
(e)	Text annotation on map with bold, underline and Italic in different color, size and fonts.
(f)	Facility to create new symbols and relate them to existing or user created tables.

**74. Modules for Desktop Geographic Information System (GIS): Training and Operation Tool-kit****SME 1248124**

<b><u>Symbology &amp; Annotations</u></b>	
(a)	Facility to annotate satellite image & DTM using available and user defined symbols.
(b)	Universal CAMS approved military cell library symbol with interoperable extn. Symbols are available in both 2D and 3D. Symbology conforms with the one developed by the Common Symbology board and to be addressed as per the symbol code.
(c)	Facility to create military symbols from textual equivalent of the military symbol.
(d)	Placement of selected military symbol or user created symbol on the displayed map through explicit grid reference given by the user or on mouse click.
<b><u>Strategic Planning support</u></b>	
(a)	Supports displaying and editing Army-specific vector overlay features including: <ul style="list-style-type: none"> <li>i. Borders/boundaries including Corps/Division boundaries.</li> <li>ii. Route planning on maps/satellite imageries.</li> <li>iii. Overlay display of all or several layers (own formations).</li> <li>iv. Overlay display of all or several layers (enemy formations).</li> <li>v. Deployment/Scenario depiction to include military symbols, text, arrows for own/enemy, air defence guns, air defence radars, artillery, minefields, and all kinds of obstacles like DCBs, canals etc.</li> <li>vi. Superimpose deployment data over maps or satellite images in 2D / 3D.</li> <li>vii. Superimpose sectors / deployment / intelligence</li> <li>viii. ORBAT of own / enemy deployment, tgt library along with formation boundary display to be automatically carried out.</li> <li>ix. Symbol editor Library for storage of Mil Symbols like nodes /Artillery/Air Defence Artillery/ way points/targets /etc.</li> <li>x. Changes dynamically deployment-type based on attribute update.</li> <li>xi. Facility to animate the style of vector overlays.</li> </ul>
(b)	Distances in nautical miles or km, point to point and traverse (recce).
(c)	Instant point-to-point calculations, sequence of points (patrol/recce).
(d)	Line of Sight calculations (360 deg).
(e)	Line of Communication Masking Patterns (360 deg).
(f)	Battle Plans / Contingency Plans / Counter Attacks. <ul style="list-style-type: none"> <li>i. Battle Plan – to store all deployments, force move arrows, etc as one file.</li> <li>ii. Contingency plans – to store all deployments, force move arrows, etc as one file.</li> <li>iii. Contingency Attack plans – to store all deployments, force move arrows, etc as one file.</li> <li>iv. Going / Poor Going/ No Go layers – [manual entry tool – to render in shades of brown]</li> <li>v. Archival of plans with associated maps and imagery.</li> </ul>



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(g)	Infantry Functions
	• Recce /Patrol calculations / route marches.
	• Terrain Slope depiction
	• Moving map display rehearsal for briefing
	• Moving satellite imagery display for briefing
	• Slope Calculations [Gradient]
(h)	Counter Insurgency Functions
	i. Details of Encounter. Recce /Patrol calculations / route marches.
	ii. Terrorists killed / surrendered / apprehended.
	iii. Details of OGWs.
	iv. Infiltration routes.
(i)	Intelligence EWCP / Infiltration / OGW Mapping
	i. EWCP data superposition.
	ii. Infiltration routes over maps.
	iii. OGW data overlay.
(j)	Artillery Functions.
	i. En / Own Disposition of guns / radars – across all scales, 1024 units [place a gun or radar by clicking at location or entering GR].
	ii. Crest clearance and line of sight calculations over weapon range, any axis.
	iii. Gun Density calculations [click to depict guns in range].
	iv. Gun area coverage diagrams with arcs or circles.
	v. Fire plan entry, FCC related functions.
	vi. User editable gun data / ranges.
	vii. Several Gun function are present inbuilt. Creates 360 degree visibility mask diagrams fairly rapidly.
(k)	Army AD Functions.
	i. Disposition of en / own FUs – with range and gun data.
	ii. Radar overlays.
	iii. Flight planning and execution of all types of aircraft.
	iv. Time of arrival in gun zone calculation – hold fire based on predicted path.
	v. Navigational calculations.
(l)	Signals functions.
	i. Point-to-Point Communication Links - shows terrain profile, compute power level.
	ii. Line of sight through 360 degrees with shading of blind spots 10 to100 km.
	iii. Mark points above specified height or below a specific point.
	iv. Indicate height of point at any instantaneous lat / long.
	v. Overlay of EW map.
(m)	Intelligence Functions.
	i. Overlay location of activity like terrorist camps by clicking at GR.
	ii. Tagging data on sate pictures.
	iii. Super position of military symbols on sate images
(n)	1. Attribute based queries and search on huge data sets
	2. Classification of data-sets into logical groupings
	3. Flexibility to identify patterns into dataset
	4. Online interactive reports for live data interpretation
	5. Downloadable customized MIS reports in common formats such as adobe pdf and Microsoft excel.
	6. Ability to introduce charts such as bar chart, pie charts, etc.
	7. Interactive reports to view related data by selecting regions in the graph.
	8. Interface to provide reports for plotting in GeorbIS GIS application with a single click.
	9. Interactive presentation with animated sequences of GIS data sets

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**75. Modules for Desktop Geographic Information System (GIS): Geospatial analysis Tool-kit**

**SME 1248125**

(a)	Geometry Operations and Attributes Analysis
	<ul style="list-style-type: none"> <li>i. Geometrical and Vector Operations <ul style="list-style-type: none"> <li>a. Point, line and polygon buffer operations to filter features within user defined proximity</li> <li>b. Boolean, Exclusion, Inclusion Operations on Features and Feature Layers</li> <li>c. Facility to create user defined operational templates functions</li> </ul> </li> <li>ii. Finding all features intersecting a defined feature</li> <li>iii. Distance and Area between two selected points using <ul style="list-style-type: none"> <li>a. Linear and Aerial distance</li> <li>b. Aerial as well as Projected Area</li> </ul> </li> <li>iv. Elevation Profile against user defined path</li> <li>v. Angle, Slope and Height difference along terrain</li> <li>vi. Query Builder for User defined templates for attribute based search</li> <li>vii. Classification of query results on patterns</li> </ul>
(b)	Pre-defined Geospatial Analysis
	<ul style="list-style-type: none"> <li>I. Hill shade generation with user-defined color coding</li> <li>II. Slope-aspect generation with user defined color coding</li> <li>III. Sectional profile of selected route on map/mosaic of maps.</li> <li>IV. Steepest path calculation between given two points</li> <li>V. Contour map generation in form of vector as well as raster maps with user defined colors</li> <li>VI. Viewshed analysis with user defined colors</li> <li>VII. Cut-and-fill analysis for elevation data</li> <li>VIII. Shaded relief display</li> <li>IX. Watershed analysis</li> <li>X. Flooding analysis</li> </ul>
(c)	Visibility Analysis
	<ul style="list-style-type: none"> <li>I. Line-of-sight analysis – point-to-point, fan and cone</li> <li>II. Radio line-of-sight analysis</li> <li>III. Crest clearance and gun range simulation</li> </ul>
(d)	Alamanac Analysis
	<ul style="list-style-type: none"> <li>I. Sun rise time and Azimuth.</li> <li>II. Sun set time and Azimuth.</li> <li>III. Moon set time and Azimuth.</li> <li>IV. Moon rise time and Azimuth.</li> <li>V. Phases of Moon( From New moon)</li> </ul>
(e)	Network Analysis
	<ul style="list-style-type: none"> <li>I. Constrained based Least Cost Path Computation</li> <li>II. Node to Node Traversal Time Computation</li> <li>III. Shortest Path including and avoiding user defined features</li> </ul>
(f)	3D Analysis
	<ul style="list-style-type: none"> <li>I. 3D line conflict identifications</li> <li>II. 3D Conical and Spherical Coverages</li> <li>III. Impact Analysis</li> <li>IV. Convex Hull Generation</li> <li>V. Distance and Height Computation from Stereo Pairs</li> </ul>

**76. Modules for Desktop Geographic Information System (GIS): Geospatial database creation**

**SME 1248126**

<b>Data Compliance</b>	
(a)	OGC Compliant and integrates with other OGC Compliant GIS products which are available in the Software Market.
(b)	Developed on OGC and ISO concepts for describing and delivering data and built on a 'Service Oriented Architecture' (SOA).

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(c)	OGC Compliance Certificates for the following:
	i. WMS – Web Map Service
	ii. WCS – Web Coverage Service
	iii. WFS – Web Feature Service
	iv. WFS-T – Web Feature Service (Transactional)
<b><u>Database support</u></b>	
(a)	Allows connecting to any standard geospatial database including Oracle and other equivalent databases Provides facility to host distributed databases.
<b><u>Data Formats</u></b>	
(a)	Topographical maps (from any source) in Vector/Raster format with auto seamless display of varying scales.
(b)	Support for following raster data formats:
	i. Native Geo-tagged formats including – GeoTIFF, TIFF, BigTIFF, HDF5, Multi-band GeoTIFF and DTED
	ii. Popular Non Geo-tagged Formats – JPEG, BMP and PNG (software allows specifying extents)
	iii. Data available through services – WMS and TMS
(c)	Support for following vector data formats:
	i. Geotagged data formats including Shape file, DGN (V7 and V8), KML & GML including metadata
	ii. Popular GPS data formats including .gpx
	iii. Data available through services – WFS
(d)	Support for following data resolutions:
	i. Raster maps of resolution upto 50 cm or better
	ii. Satellite imagery with bit-depth of more than 8 bits (10, 12 and 16 bits)
	iii. DTED data of resolution upto 2 m or better
(e)	Support for following 3D model data formats:
	i. COLLADA Model file (*.dae)
	ii. GeoVRML
(f)	Support for importing CAMS provided DGN data (with / without Oracle Dump) to native GIS format. Has capability to pre-process CAMS data.
	i. No loss of data in conversion.
	ii. No inaccuracies result from the conversion process
	iii. Maintains color scheme of DGN entities when converting to native GIS formats
(i)	On the fly Coordinates System transformation.
(j)	Support for loading and displaying 2D and equivalent 3D military symbols
(k)	Facility to convert data vector layers and overlays to any standard GIS format (like SHP/DGN/Oracle/SQL Server) and vice versa along with related data with vector entities without using any middleware/ translator.
(l)	User can edit (both spatial and attributes) layers if available in MS access, Oracle, SQL server, PostGIS and OGC WFS-T directly without use of any middleware technology.
<b><u>Satellite Imagery Processing</u></b>	
(a)	Support for Satellite images includes all Indian and leading International satellites in all common data formats such as geotiff, JPEG2000, MrSID & ECW, etc. at native resolution.
(b)	Support for creating a mosaic using original image dataset
(c)	Support for computing and storing a multi-resolution cache of image tiles in standard TMS format
(d)	Validation of georegistry of satellite image with the corresponding vector / raster map by tools like Swipe, Flicker and Blend can be done.
(e)	Following satellite image pre-processing functions are supported:

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	I. Pan Sharpening
	II. Change Detection
	III. Re-projection from one coordinate system to another
	IV. Image enhancement filters like Brightness, Contrast, & Histogram Equalization
<b>Map Display Support</b>	
(a)	Display of 3D coordinates under mouse cursor
	I. Latitude and Longitude in multiple modes-Degree, minutes & decimals [or degrees, minutes & seconds].
	II. Mil Grid Reference [8 characters alphanumeric, eg MT245369] based on Secondary coordinates Sys of DGN provided by CAMS without giving parameters from external source. Inaccuracies in GR readout on raster and vector maps are not acceptable. Able to handle maps of two adjacent grid zones without any errors in GR readout.
(b)	Interactive 2D map display with following
	I. Selected raster layers
	II. Selected vector layers
(c)	Interactive 3D terrain model display with following
	I. DEM Data displayed in 3D as terrain model
	II. Selected raster layers mapped on underlying elevation model
	III. Selected vector layers draped on underlying elevation model
	IV. 3D models positioned on top of elevation model similar to Google Earth
(d)	Support for level-of-detail based display.
(e)	Support for full-screen map display mode by hiding all menus and other widgets
(f)	Facility to change transparency of individual raster layers making them semi-transparent so that multiple layers can be displayed simultaneously
<b>Data Storage</b>	
(a)	Uses efficient data management mechanism so as to optimize rendering performance and maintain user interactivity even with large datasets
(b)	All vector data is stored in the GIS database using OGC compliant (WFS-T) protocol
(c)	Provides tools to import raw raster and vector data and publish them on an OGC compliant GIS server & suitable Geospatial RDBMS

**77. Server Geographic Information System**

**(GIS): For Enterprise users**

**SME 1248127**

**Generic Features**

<b>Compliance</b>	
(a)	OGC Compliant and integrates with other OGC Compliant GIS products which are available in the Software Market.
(b)	Developed on OGC and ISO concepts for describing and delivering data and built on a 'Service Oriented Architecture' (SOA).
(c)	OGC Compliance Certificates and Publish data for the following:
	I. WMS – Web Map Service
	II. WCS – Web Coverage Service
	III. WFS – Web Feature Service
	IV. WFS-T – Web Feature Service (Transactional)
(d)	Support for Standard Vector and Raster formats
<b>Database support</b>	
(a)	Allows connecting to any standard geospatial database including Oracle and other equivalent databases Provides facility to host distributed databases.
<b>Map Display Support</b>	
(a)	Display of 3D coordinates under mouse cursor
	I. Latitude and Longitude in multiple modes-Degree, minutes & decimals [or degrees, minutes & seconds].
	II. Mil Grid Reference [8 characters alphanumeric, eg MT245369] based on Secondary coordinates

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	Sys of DGN provided by CAMS without giving parameters from external source. Inaccuracies in GR readout on raster and vector maps are not acceptable. Able to handle maps of two adjacent grid zones without any errors in GR readout.
(b)	Interactive 2D map display with following <ul style="list-style-type: none"> <li>I. Selected raster layers</li> <li>II. Selected vector layers</li> </ul>
(c)	Interactive 3D terrain model display with following <ul style="list-style-type: none"> <li>I. DEM Data displayed in 3D as terrain model</li> <li>II. Selected raster layers mapped on underlying elevation model</li> <li>III. Selected vector layers draped on underlying elevation model</li> <li>IV. 3D models positioned on top of elevation model similar to Google Earth</li> </ul>
(d)	Varying light intensity and sun angle for the DTM view
(f)	Support for level-of-detail based display.
(g)	Support for full-screen map display mode by hiding all menus and other widgets
(h)	Facility to change transparency of individual raster layers making them semi-transparent so that multiple layers can be displayed simultaneously
<b><u>Usability/Interface</u></b>	
(a)	Map data interaction with mouse, keyboard as well as touch gestures (if available on display)
(b)	Intuitive data navigation supporting pan, zoom, tilt, rotate using Google Earth like manipulators
(c)	Support for advanced 3D manipulators including Globe Navigator, Walk, Fly and Drive
(d)	Support to display list of raster, vector and analysis layers using a tree-like view
(e)	Support to toggle the display of individual layers directly using the tree view
(f)	Support for reordering the display of individual layers by dragging the layers to the desired position in the tree view
(g)	Support for GeoJump to a layer/element directly from the tree view by double-clicking on the element
(h)	Support for showing the view orientation using a digital compass widget displayed along with the map
(i)	Auto adjustment of size of polygons, lines and points on changing viewer position.
(j)	Interactive map sheets display with highlighting and display of map sheet number.
(k)	Interactive display of symbols and information retrieval on selection.
(l)	Support for storing local application state as a workspace and retrieving it later. Workspace feature supports: <ul style="list-style-type: none"> <li>I. Storing any number of raster and vector layers loaded to create a mosaic of maps</li> <li>II. Displaying list of stored workspaces and allowing user to select and load a workspace</li> <li>III. Support to display minimum 4 recent workspaces on the top</li> </ul>
(m)	Support for opening multiple windows and viewing more than one map at a time by resizing windows.
(n)	Support for geolinking of windows to allow visually comparing same spatial data from multiple data sources
<b><u>Symbolology &amp; Annotations</u></b>	
(a)	Facility to annotate satellite image & DTM using available and user defined symbols.
(b)	Orientation of symbol maintained for all view angles in 3D.
(c)	Graphics drawing facilities to include manipulation of graphics and symbols (Save, Copy, Erase, Rotate, Resize, Delete etc.).
(f)	Text Annotation to be Draped on the raster image.
(g)	Text annotation on map with bold, underline and Italic in different color, size and fonts.
(h)	Facility to create new symbols and relate them to existing or user created tables.
<b><u>Overlay and Vector Editing Features</u></b>	
(a)	Facility to edit/add/delete vector entities in the base vector maps including any shape
(b)	Facility to create point, multi-point, line, line-segment, filled and boundary polygon vectors
(c)	Facility to control the display style of vectors with user defined color, thickness, transparency, stippling and textures
(d)	Editable text with facility to change font and color of annotated text such as city name
(e)	Grouping of created user layers.
(f)	Scale up / scale down facility to different scale maps for the same location.
(g)	Undo and redo facility for minimum four steps for all feature editing operations

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**Server Features**

<b><u>Architecture, Interoperability and Integration</u></b>	
(a)	Compliant as per compliance standard mentioned above
(b)	Follows scalable client-server architecture and supports the following application software configurations:
	i. Desktop-based application able to connect to GIS server and allow loading an analysis on various GIS data formats.
	ii. Web-based clients with support for data viewing and basic analysis (as mentioned in the Web-GIS section).
(c)	Supports databases as per standard mentioned above
(e)	Able to host services for running GIS analysis on the server and provide results as WPS service that can be used by a desktop or web based client.
(f)	Supports user management schema to restrict access of data to users and supports authentication via Windows Active Directory, LDAP, NIS, etc
(g)	Supports secure socket network communication for secure data access.
(h)	Able to serve at least 10 requests/second
(i)	Provides frontend having all common modern features including the following:
	i. Support for publishing geospatial data to the database server.
	ii. Support for publishing custom user data to the server later to be used for analysis.
	iii. Support for querying and listing all the data available on the server.
	iv. Support for customizations of graphical user interface as per user requirements
	v. Support for collaborative data creation and editing by multiple users over the network
<b><u>Data Format Support</u></b>	
(a)	Provides data format through Data processing application
<b><u>Analysis Tools</u></b>	
(a)	Provides all analysis tools through Analyst cartridge as WPS services.
<b><u>Symbolology &amp; Annotations</u></b>	
(a)	Facility to maintain a standard symbology as mentioned above.
<b><u>Satellite Imagery</u></b>	
(b)	Allows for publishing data online through data processing application.
<b><u>Database Management</u></b>	
(a)	Storage of map, terrain and raster information in the back end RDBMS.
(b)	Storage of user symbols in the database.
(c)	Storage of user specified information together with attributes in tables – table structures to be designed to meet user requirements as part of customization.
(d)	Display of user defined events in the form of symbols on the map.
(e)	Provision of drill down facility to view details of any symbol displayed on the map.
(f)	Provision to interactively query for symbols and aggregates by indicating an area of the map and providing any additional inputs required in custom designed forms.
(g)	Facility to integrate video data in database attributes both in user created and already available database tables.
(h)	Updating of Grid Reference fields in the database tables done automatically when updating data for symbols.
(i)	Provides viewing the result of query in a separate window that can be resized so as not to obstruct the view area of the map or top bar / bottom bar of the display window.
(j)	Provides viewing the result in graphical form i.e. query result gets displayed in form of appropriate symbols on the map. Facilitates automatic updating of grid reference fields corresponding to symbols used for map annotation.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(k)	Facility to take print outs of the transactions carried out in the database at the end of the day so as to validate the entered.
(l)	Transfer of database tables associated with overlays being transferred on the network to other nodes.
(m)	Facility to import legacy data from other databases such as MS access and Dbase.
<b><u>Database Administration &amp; User Management</u></b>	
(a)	Database security through access rights
(b)	Database security where possible through encoding of data
(c)	Database visualization.
(d)	Database administration functions
(e)	User creation, deletion, modification, creation / granting of roles and privileges
(f)	Creation of table, deletion of table, modification of table.
<b><u>Hosting of Web GIS application</u></b>	
(a)	An online frontend is provided to suffice the features mentioned below.

***Web Client Features***

<b><u>Architecture, Interoperability</u></b>	
(a)	The web client is supported across all mobile and desktop web browsers across all platforms.
(b)	The application software provides all common modern features including the following: <ul style="list-style-type: none"> <li>i. Support for 3D stereo viewing with compatible hardware</li> <li>ii. Support for multi-touch user interface</li> <li>iii. Support for interactive 3D globe view</li> <li>iv. Support for customizations of graphical user interface as per user requirements</li> <li>v. Support for collaborative data creation and editing by multiple users over the network</li> </ul>
(c)	The web client provides interactive 3D terrain rendering facility.
(d)	The web client does not require installation of any software on the client system like plugins or ActiveX controls, etc, which can interfere with the security policies of the organization. The client uses standard Web technologies like HTML & JS and support a wide range of browsers including Google Chrome & Firefox on both Linux and Windows
(e)	The web client resembles the workflow and GUI used by the Desktop GIS and other common web-based viewers to reduce learning curve for users
<b><u>Map Display</u></b>	
(a)	Provides map display capabilities as mentioned above.
(b)	Support for 3D stereo display of map and terrain data in following modes: <ul style="list-style-type: none"> <li>I. Anaglyph stereo</li> <li>II. Side-by-side stereo</li> </ul>
<b><u>Usability/Interface</u></b>	
(a)	Provides all usability features and UI design as mentioned above
<b><u>Analysis Tools</u></b>	
(a)	Provides online usage of analysis tools mentioned above.
<b><u>Symbology</u></b>	
(a)	Supports the use and display of same standard military cell library symbols and symbol display as mentioned above.
<b><u>Application-specific Customizations</u></b>	
(a)	Supports displaying and editing Army-specific vector overlay features mentioned above.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**78. Modules for Server Geographic Information System (GIS): Training and Operation Tool-kit**

**SME 1248128**

<b><u>Symbology &amp; Annotations</u></b>	
(a)	Facility to annotate satellite image & DTM using available and user defined symbols.
(b)	Universal CAMS approved military cell library symbol with interoperable extn. Symbols are available in both 2D and 3D. Symbology conforms with the one developed by the Common Symbology board and to be addressed as per the symbol code.
(c)	Facility to create military symbols from textual equivalent of the military symbol.
(d)	Placement of selected military symbol or user created symbol on the displayed map through explicit grid reference given by the user or on mouse click.
<b><u>Strategic Planning support</u></b>	
(a)	Supports displaying and editing Army-specific vector overlay features including: <ul style="list-style-type: none"> <li>i. Borders/boundaries including Corps/Division boundaries.</li> <li>ii. Route planning on maps/satellite imageries.</li> <li>iii. Overlay display of all or several layers (own formations).</li> <li>iv. Overlay display of all or several layers (enemy formations).</li> <li>v. Deployment/Scenario depiction to include military symbols, text, arrows for own/enemy, air defence guns, air defence radars, artillery, minefields, and all kinds of obstacles like DCBs, canals etc.</li> <li>vi. Superimpose deployment data over maps or satellite images in 2D / 3D.</li> <li>vii. Superimpose sectors / deployment / intelligence</li> <li>viii. ORBAT of own / enemy deployment, tgt library along with formation boundary display to be automatically carried out.</li> <li>ix. Symbol editor Library for storage of Mil Symbols like nodes /Artillery/Air Defence Artillery/ way points/targets /etc.</li> <li>x. Changes dynamically deployment-type based on attribute update.</li> <li>xi. Facility to animate the style of vector overlays.</li> </ul>
(b)	Distances in nautical miles or km, point to point and traverse (recce).
(c)	Instant point-to-point calculations, sequence of points (patrol/recce).
(d)	Line of Sight calculations (360 deg).
(e)	Line of Communication Masking Patterns (360 deg).
(f)	Battle Plans / Contingency Plans / Counter Attacks. <ul style="list-style-type: none"> <li>i. Battle Plan – to store all deployments, force move arrows, etc as one file.</li> <li>ii. Contingency plans – to store all deployments, force move arrows, etc as one file.</li> <li>iii. Contingency Attack plans – to store all deployments, force move arrows, etc as one file.</li> <li>iv. Going / Poor Going/ No Go layers – [manual entry tool – to render in shades of brown]</li> <li>v. Archival of plans with associated maps and imagery.</li> </ul>
(g)	Infantry Functions <ul style="list-style-type: none"> <li>i. Recce /Patrol calculations / route marches. <ul style="list-style-type: none"> <li>• Terrain Slope depiction</li> <li>• Moving map display rehearsal for briefing</li> <li>• Moving satellite imagery display for briefing</li> <li>• Slope Calculations [Gradient]</li> </ul> </li> </ul>
(h)	Counter Insurgency Functions <ul style="list-style-type: none"> <li>i. Details of Encounter. Recce /Patrol calculations / route marches.</li> <li>ii. Terrorists killed / surrendered / apprehended.</li> <li>iii. Details of OGWs.</li> <li>iv. Infiltration routes.</li> </ul>
(i)	Intelligence EWCP / Infiltration / OGW Mapping <ul style="list-style-type: none"> <li>i. EWCP data superposition.</li> <li>ii. Infiltration routes over maps.</li> <li>iii. OGW data overlay.</li> </ul>



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(j)	Artillery Functions.
	i. En / Own Disposition of guns / radars – across all scales, 1024 units [place a gun or radar by clicking at location or entering GR].
	ii. Crest clearance and line of sight calculations over weapon range, any axis.
	iii. Gun Density calculations [click to depict guns in range].
	iv. Gun area coverage diagrams with arcs or circles.
	v. Fire plan entry, FCC related functions.
	vi. User editable gun data / ranges.
(k)	Several Gun function are present inbuilt. Creates 360 degree visibility mask diagrams fairly rapidly.
	Army AD Functions.
	i. Disposition of en / own FUs – with range and gun data.
	ii. Radar overlays.
	iii. Flight planning and execution of all types of aircraft.
(l)	iv. Time of arrival in gun zone calculation – hold fire based on predicted path.
	v. Navigational calculations.
	Signals functions.
	i. Point-to-Point Communication Links - shows terrain profile, compute power level.
	ii. Line of sight through 360 degrees with shading of blind spots 10 to 100 km.
(m)	iii. Mark points above specified height or below a specific point.
	iv. Indicate height of point at any instantaneous lat / long.
	v. Overlay of EW map.
	Intelligence Functions.
	i. Overlay location of activity like terrorist camps by clicking at GR.
(n)	ii. Tagging data on satellite pictures.
	iii. Super position of military symbols on satellite images
	I. Attribute based queries and search on huge data sets
	II. Classification of data-sets into logical groupings
	III. Flexibility to identify patterns into dataset
	IV. Online interactive reports for live data interpretation
	V. Downloadable customized MIS reports in common formats such as Adobe PDF and Microsoft Excel.
	VI. Ability to introduce charts such as bar chart, pie charts, etc.
	VII. Interactive reports to view related data by selecting regions in the graph.
	VIII. Interface to provide reports for plotting in GIS application with a single click.
	IX. Interactive presentation with animated sequences of GIS data sets

**79. Modules for Server Geographic Information System (GIS): Geospatial analysis Tool-kit****SME 1248129**

(a)	Geometry Operations and Attributes Analysis
	I. Geometrical and Vector Operations
	a. Point, line and polygon buffer operations to filter features within user defined proximity
	b. Boolean, Exclusion, Inclusion Operations on Features and Feature Layers
	c. Facility to create user defined operational templates functions
	II. Finding all features intersecting a defined feature
	III. Distance and Area between two selected points using
	a. Linear and Aerial distance
	b. Aerial as well as Projected Area
	IV. Elevation Profile against user defined path
	V. Angle, Slope and Height difference along terrain
	VI. Query Builder for User defined templates for attribute based search
	VII. Classification of query results on patterns
(b)	Pre-defined Geospatial Analysis
	i. Hill shade generation with user-defined color coding
	ii. Slope-aspect generation with user defined color coding
	iii. Sectional profile of selected route on map/mosaic of maps.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	iv. Steepest path calculation between given two points
	v. Contour map generation in form of vector as well as raster maps with user defined colors
	vi. Viewshed analysis with user defined colors
	vii. Cut-and-fill analysis for elevation data
	viii. Shaded relief display
	ix. Watershed analysis
	x. Flooding analysis
(c)	Visibility Analysis
	I. Line-of-sight analysis – point-to-point, fan and cone
	II. Radio line-of-sight analysis
	III. Crest clearance and gun range simulation
(d)	Alamanac Analysis
	I. Sun rise time and Azimuth.
	II. Sun set time and Azimuth.
	III. Moon set time and Azimuth.
	IV. Moon rise time and Azimuth.
	V. Phases of Moon( From New moon)
(e)	Network Analysis
	I. Constrained based Least Cost Path Computation
	II. Node to Node Traversal Time Computation
	III. Shortest Path including and avoiding user defined features
(f)	3D Analysis
	I. 3D line conflict identifications
	II. 3D Conical and Spherical Coverages
	III. Impact Analysis
	IV. Convex Hull Generation
	V. Distance and Height Computation from Stereo Pairs

**80. Modules for Server Geographic Information System (GIS): Geospatial database creation**

**SME 1248130**

<b>Data Compliance</b>	
(a)	OGC Compliant and integrates with other OGC Compliant GIS products which are available in the Software Market.
(b)	Developed on OGC and ISO concepts for describing and delivering data and built on a 'Service Oriented Architecture' (SOA).
(c)	OGC Compliance Certificates for the following:
	i. WMS – Web Map Service
	ii. WCS – Web Coverage Service
	iii. WFS – Web Feature Service
	iv. WFS-T – Web Feature Service (Transactional)
<b>Database support</b>	
(a)	Allows connecting to any standard geospatial database including Oracle and other equivalent databases Provides facility to host distributed databases.
<b>Data Formats</b>	
(a)	Topographical maps (from any source) in Vector/Raster format with auto seamless display of varying scales.
(b)	Support for following raster data formats:
	i. Native Geo-tagged formats including – GeoTIFF, TIFF, BigTIFF, HDF5, Multi-band GeoTIFF and DTED
	ii. Popular Non Geo-tagged Formats – JPEG, BMP and PNG (software allows specifying extents)
	iii. Data available through services – WMS and TMS
(c)	Support for following vector data formats:

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	i. Geotagged data formats including Shape file, DGN (V7 and V8), KML & GML including metadata
	ii. Popular GPS data formats including .gpx
	iii. Data available through services – WFS
(d)	Support for following data resolutions:
	I. Raster maps of resolution upto 50 cm or better
	II. Satellite imagery with bit-depth of more than 8 bits (10, 12 and 16 bits)
	III. DTED data of resolution upto 2 m or better
(e)	Support for following 3D model data formats:
	i. COLLADA Model file (*.dae)
	ii. GeoVRML
(f)	Support for importing CAMS provided DGN data (with / without Oracle Dump) to native GIS format. Has capability to pre-process CAMS data.
	i. No loss of data in conversion.
	ii. No inaccuracies result from the conversion process
	iii. Maintains color scheme of DGN entities when converting to native GIS formats
(i)	On the fly Coordinates System transformation.
(j)	Support for loading and displaying 2D and equivalent 3D military symbols
(k)	Facility to convert data vector layers and overlays to any standard GIS format (like SHP/DGN/Oracle/SQL Server) and vice versa along with related data with vector entities without using any middleware/ translator.
(l)	User can edit (both spatial and attributes) layers if available in MS access, Oracle, SQL server, PostGIS and OGC WFS-T directly without use of any middleware technology.
<b><u>Satellite Imagery Processing</u></b>	
(a)	Support for Satellite images includes all Indian and leading International satellites in all common data formats such as geotiff, JPEG2000, MrSID & ECW, etc. at native resolution.
(b)	Support for creating a mosaic using original image dataset
(c)	Support for computing and storing a multi-resolution cache of image tiles in standard TMS format
(d)	Validation of georegistry of satellite image with the corresponding vector / raster map by tools like Swipe, Flicker and Blend can be done.
(e)	Following satellite image pre-processing functions are supported:
	i. Pan Sharpening
	ii. Change Detection
	iii. Re-projection from one coordinate system to another
	iv. Image enhancement filters like Brightness, Contrast, & Histogram Equalization
<b><u>Map Display Support</u></b>	
(a)	Display of 3D coordinates under mouse cursor
	i. Latitude and Longitude in multiple modes-Degree, minutes & decimals [or degrees, minutes & seconds].
	ii. Mil Grid Reference [8 characters alphanumeric, eg MT245369] based on Secondary coordinates Sys of DGN provided by CAMS without giving parameters from external source. Inaccuracies in GR readout on raster and vector maps are not acceptable. Able to handle maps of two adjacent grid zones without any errors in GR readout.
(b)	Interactive 2D map display with following
	i. Selected raster layers
	ii. Selected vector layers
(c)	Interactive 3D terrain model display with following
	I. DEM Data displayed in 3D as terrain model
	II. Selected raster layers mapped on underlying elevation model
	III. Selected vector layers draped on underlying elevation model
	IV. 3D models positioned on top of elevation model similar to Google Earth
(f)	Support for level-of-detail based display.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(g)	Support for full-screen map display mode by hiding all menus and other widgets
(h)	Facility to change transparency of individual raster layers making them semi-transparent so that multiple layers can be displayed simultaneously
<b>Data Storage</b>	
(a)	Uses efficient data management mechanism so as to optimize rendering performance and maintain user interactivity even with large datasets
(b)	All vector data is stored in the GIS database using OGC compliant (WFS-T) protocol
(c)	Provides tools to import raw raster and vector data and publish them on an OGC compliant GIS server & suitable Geospatial RDBMS

**81. Modules for customization of Desktop and Server Geographic Information System (GIS): GIS Software Development Toolkit**  
**SME 1248131**

<b>Application Customization Features</b>	
(a)	Add new functionality, add custom GUI, remove existing GUI, custom visual theme and custom application name
(b)	QT Widgets for 2D and 3D Rendering Surfaces
(c)	QT Interfaces to various GUI Elements – buttons, text panes, input panes, output panes, trees etc.
(d)	Plugin Interfaces for custom computation, functionality modules, Synchronous/Asynchronous
(e)	Plugin Interfaces for custom data loaders Synchronous/Asynchronous
(f)	Database framework for adding custom database connectors
(g)	Define Custom Layers and Custom Elements
(h)	Define Custom Containers
(i)	Save/Save As/Load Interfaces
(j)	Object Creation Interfaces - Assigning Factories
(k)	Data Manipulation Interfaces - Assigning Visitor
(l)	Operation Feedback Mechanisms – Assigning Callbacks
(m)	Intercommunication/Event based Triggering – Message subscribe, unsubscribe, functionality
<b>Interaction Features</b>	
(α)	Interfaces for HID and VR gadgets including mouse, keyboard, joystick, trackers
(β)	Undo/Redo Interfaces
(χ)	Selection/De-selection Interfaces
(δ)	Copy/Paste buffers Interfaces
(ε)	Custom Camera Controls
(φ)	Terrain Manipulator Controls
(γ)	Walkthrough Manipulator Controls
(η)	Flythrough Manipulator Controls
(ι)	Head Tracker Manipulator Controls
(φ)	Joystick Manipulator Controls
(κ)	Object Visibility Manipulation Controls
(λ)	Camera Collision Feedback Interfaces
(μ)	3D Geo-link Parameter Control
(ν)	Geo Jump Parameter Control
(ο)	Search Feedback, Custom Search Filter Implementation
(π)	Object Manipulator Control to Translate, Offset, Scale, Rotate in all 3 Dimensions
<b>Data Visualization Features</b>	
(a)	2D and 3D Terrain Visualization Switching Control
(b)	Define Multiple Views for same or different data
(c)	Level of Details Parameters
(d)	3D Stereo Parameter
(e)	Controls on Field of view, Scale
(f)	Re-order Raster layers Controls
(g)	Re-order vector layers Controls
(h)	Lat-Long, MGRS Grid Display Controls
(i)	Define Selection Highlight Color Control
(j)	Vector Data Tile Size Control

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(k)	Terrain Visualization Interpolation Filter Parameter Control (linear, cubic, bicubic, lancos)
(l)	De-clutter Parameter Control for symbols, icons, text
(m)	Webpages, Video, Audio, Images and Text Viewers Control
(n)	Zoom to Selection Animation Controls
(o)	Tree/Hierarchy View Controls
(p)	Tabular Data Viewer Controls
(q)	Auto-rotate along axis, camera parameter control for 2D-3D symbols
(r)	Auto-Scale parameter control for 2D-3D symbols
(s)	Terrain Clamping parameter control
(t)	Per-Pixel/Per vertex lighting control
<b>Data Creation, Editing Features</b>	
(a)	2D/3D Point, Multipoint creation – control on parameters at specified location, in specified layer, on defined line, within defined boundary
(b)	2D/3D Line, multiline, line loop creation –from selected points, from existing polygon boundaries, on 3d surface, smooth curves – catmull rom, NURBS parameter control
(c)	2D/3D Polygon Creation – defined closed boundary, on surfaces, smooth surfaces, from point cloud, from height field, support for default geometries cones,
(d)	Style Control – Transparency, Color, Thickness, Pattern, Fill, Boundary
(e)	Representation Control – 2D,3D Icons/Icon Groups
(f)	Transforms - Translate, Orient, Scale, Offset
(g)	Insert/delete, split, stich points for redefining shapes of points, lines, polygons
<b>GIS Data Features</b>	
(a)	Topographical maps (from any source) in Vector/Raster format with auto seamless display of varying scales.
(b)	Support for following raster data formats:
	i. Native Geo-tagged formats including – GeoTIFF, TIFF, BigTIFF, HDF5, Multi-band GeoTIFF and DTED
	ii. Popular Non Geo-tagged Formats – JPEG, BMP and PNG (software allows specifying extents)
	iii. Data available through services – WMS and TMS
(c)	Support for following vector data formats:
	i. Geotagged data formats including Shape file, DGN (V7 and V8), KML & GML including metadata
	ii. Popular GPS data formats including .gpx
	iii. Data available through services – WFS
(d)	Support for following data resolutions:
	i. Raster maps of resolution upto 50 cm or better
	ii. Satellite imagery with bit-depth of more than 8 bits (10, 12 and 16 bits)
	iii. DTED data of resolution upto 2 m or better
(e)	Support for following 3D model data formats:
	iii. COLLADA Model file (*.dae)
	iv. GeoVRML
(f)	Support for importing CAMS provided DGN data (with / without Oracle Dump) to native GIS format. Has capability to pre-process CAMS data.
	i. No loss of data in conversion.
	ii. No inaccuracies result from the conversion process
	iii. Maintains color scheme of DGN entities when converting to native GIS formats
(g)	Support for loading and displaying UAV video clip with geo-referencing data
(h)	Support for popular video formats including AVI and MPEG
(i)	On the fly Coordinates System transformation.
(j)	Support for loading and displaying 2D and equivalent 3D military symbols

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

(k)	Facility to convert data vector layers and overlays to any standard GIS format (like SHP/DGN/Oracle/SQL Server) and vice versa along with related data with vector entities without using any middleware/ translator.
(l)	DGN, GWS, shape and GML files in a single map window and able to query/ filter across these seamlessly. User can edit (both spatial and attributes) layers if available in MS access, Oracle, SQL server, PostGIS and OGC WFS-T directly without use of any middleware technology.
<b>GIS Data Operations</b>	
(α)	Vector Relationship Operations with Parameter Control: <ul style="list-style-type: none"> <li>- A Intersects B</li> <li>- A Touches B</li> <li>- A Disjoint B</li> <li>- A Crosses B</li> <li>- A Within B</li> <li>- A Contains B</li> <li>- A Overlaps B</li> <li>- A Equals B</li> <li>- A Covers B</li> </ul>
(β)	Vector Operation for Analysis on elements or Layers (generates new elements/layer): <ul style="list-style-type: none"> <li>- Union</li> <li>- Distance</li> <li>- Intersection</li> <li>- Symmetric Difference</li> <li>- Convex Hull</li> <li>- Envelope</li> <li>- Buffer</li> <li>- Area</li> <li>- Length</li> <li>- Simplify</li> <li>- Smooth</li> </ul>
(χ)	Classification based on Attributes <ul style="list-style-type: none"> <li>- Color Change</li> <li>- Thickness/Size Change</li> <li>- Grouping</li> <li>- Highlighting</li> <li>- Selection</li> </ul>
(δ)	Elevation Data Operations: <ul style="list-style-type: none"> <li>- Height at a point</li> <li>- Height field within a convex boundary</li> <li>- Elevation along a line</li> <li>- Slope</li> <li>- Aspect</li> <li>- Gradient</li> <li>- Min Max elevation on a heightfiled</li> </ul>
(ε)	3d Operations <ul style="list-style-type: none"> <li>- Intersection between two 3d Points</li> <li>- Intersection Points for multiple lines</li> <li>- Volume within a heightfield</li> <li>- Contours along a height field</li> <li>- Distance between points</li> <li>- Objects/Geometries within a user defined 3D volume</li> </ul>
(φ)	Image Operations <ul style="list-style-type: none"> <li>- No-Data Removal</li> <li>- Pan Sharpening</li> <li>- Change Detection</li> <li>- Image Re-projection</li> <li>- Brightness Adjustment</li> <li>- Contrast Enhancement</li> <li>- Histogram Equalization</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

<b>Pre-Built Analysis Tools</b>	
(a)	Hill shade generation with user-defined color coding
(b)	Slope-aspect generation with user defined color coding
(c)	Sectional profile of selected route on map/mosaic of maps.
(d)	Steepest path calculation between given two points
(e)	Contour map generation in form of vector as well as raster maps with user defined colors
(f)	Viewshed analysis with user defined colors
(g)	Cut-and-fill analysis for elevation data
(h)	Shaded relief display
(i)	Watershed analysis
(j)	Flooding analysis
(k)	Crest Clearance
(l)	Debris Simulation
(m)	Fuel Distance Analysis
(n)	Hazard Volume
(o)	Radar LOS
(p)	Radio Coverage
(q)	View Shed Analysis
(r)	Angle and Slope Measurement between Two Points
(s)	Aerial as well as projected on Ground Area, Perimeter Calculation
(t)	Linear and Projected Distance Calculation
<b>Animation and Simulation</b>	
(a)	Event based triggering
(b)	Time Series Animation of Raster
(c)	Time Series Animation of Vector
(d)	Animation along a 3D Line
(e)	Transformation along a line
(f)	User defined Attribute Change with Time
(g)	Interpolation Definition with Time
(h)	Gravity Simulation
(i)	Event Triggering on user defined attribute value/rate change
<b>Effects and Environment</b>	
(a)	Fog Control
(b)	Cloud Control
(c)	Rain/Snow/Sleet Control
(d)	Ephemeris Data Control
(e)	Sunlight/Moonlight Control
(f)	Fire Parameter Control
(g)	Flare Parameter Control
(h)	Smoke Parameter Control
(i)	Explosion Parameter Control
(j)	Smoke Plume Parameter Control
(k)	Sun Rise/Set time and Azimuth Calculation
(l)	Moon rise/set time and Azimuth Calculation
(m)	Phases of Moon Calculations
<b>Utilities</b>	
(α)	Grid Re-sampler
(β)	Inverse Distance Weighted Interpolator
(χ)	K-means Cluster
(δ)	Kriging Interpolator
(ε)	Polynomial Interpolator
(φ)	Results Sampler
(γ)	Spatial Interpolator
(η)	Terrain Sampler
(ι)	Coordinate Conversion Functions

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	Area Grid Converter
(φ)	GDAL Function Utils
(κ)	Thread Pool Generation Functions
(λ)	Volume Grids
(μ)	WMSUtil
(ν)	Archiving Util
(ο)	XML Read/WriteFunctions
(π)	HTTP data transfer utils
(θ)	Serialization Utils
(ρ)	Matrix Operations
(σ)	AsciiRead/WriteUtils
(τ)	Binary Read/WriteUtils
(υ)	JSON Read/WriteUtils
<b>Database Operations</b>	
(a)	Interfaces for Database access – DB2, Oracle, PostgreSQL, Microsoft Access, File System
(b)	User access control interface
(c)	Create/Delete/Edit tables
(d)	Queries
(e)	Introducing Database schemas
(f)	Create/Delete/Edit files
(g)	Commands for Publishing Geospatial Data to the Database Server.
(h)	Commands for Publishing Custom User Data to the Server
<b>Networking and HLA</b>	
(a)	HLA framework using FOM
(b)	Camera Control over Network (TCP/UDP/HLA)
(c)	Entity Updates over Network (TCP/UDP/HLA)
(d)	Custom Data Transfer over Network (TCP/UDP/HLA)
(e)	Application Launch over Network (TCP/UDP)

**82. Geographic Information System (GIS) based Operational briefing and Training system**

**SME 1248132**

<b>Features</b>	<b>Specifications</b>
Compliance	OGC Compliance Certificates for the following: i. WMS – Web Map Service ii. WCS – Web Coverage Service iii. WFS – Web Feature Service iv. WFS-T – Web Feature Service (Transactional)
Data Formats	Topographical maps (from any source) in Vector/Raster format with auto seamless display of varying scales. Support for following raster data formats: Native Geo-tagged formats including – GeoTIFF, TIFF, BigTIFF, HDF5, Multi-band GeoTIFF and DTED Popular Non Geo-tagged Formats – JPEG, BMP and PNG (software allows specifying extents) Data available through services – WMS and TMS Support for following vector data formats: Geotagged data formats including Shape file, DGN (V7 and V8), KML & GML including metadata Popular GPS data formats including .gpx Data available through services – WFS Support for following data resolutions: Raster maps of resolution upto 50 cm or better Satellite imagery with bit-depth of more than 8 bits (10, 12 and 16 bits) DTED data of resolution upto 2 m or better Support for following 3D model data formats:



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<p>COLLADA Model file (*.dae)</p> <p>GeoVRML</p> <p>Support for importing CAMS provided DGN data (with / without Oracle Dump) to native GIS format. Has capability to pre-process CAMS data.</p> <p>No loss of data in conversion.</p> <p>No inaccuracies result from the conversion process</p> <p>Maintains color scheme of DGN entities when converting to native GIS formats</p> <p>Support for loading and displaying UAV video clip with geo-referencing data</p> <p>Support for popular video formats including AVI and MPEG</p> <p>On the fly coordinates System transformation.</p> <p>Support for loading and displaying 2D and equivalent 3D military symbols</p> <p>Facility to convert data vector layers and overlays to any standard GIS format (like SHP/DGN/Oracle/SQL Server) and vice versa along with related data with vector entities without using any middleware/ translator.</p> <p>DGN, GWS, shape and GML files in a single map window and able to query/ filter across these seamlessly. User can edit (both spatial and attributes) layers if available in MS access, Oracle, SQL server, PostGIS and OGC WFS-T directly without use of any middleware technology.</p> <p><b>**The software should be upgradable (if required) for sensor simulation for Forward Looking Infra-Red and Night Vision. The software should allow for visualization of the terrain in Night Vision Mode and Infra-Red Mode.</b></p>
Collaboration	<p>Application should be able to collaborate with another instance of the same application in order to replicate workflow on one system to another system irrespective of display size and resolution.</p>
Instructor and Syndicates	<p>Instructor or syndicate based logins and login page should be there.</p> <p>Instructor should be able to create scenarios and merge/change the planned scenarios.</p> <p>Support for syndicates such that they are able to plan on the created scenarios.</p>
GIS Features for the Instructor & Syndicates	<p>Creation of overlays using GIS including commonly used military symbols.</p> <p>Feature to send overlay to other syndicates and control order should be there</p> <p>Easy feature &amp; ability to mark Route of Advance based on drag and drop from hierarchical orbat tree</p> <p>Line of sight analysis</p> <p>View shed analysis</p> <p>Find highest point within an area</p> <p>Query to find area above a particular height</p> <p>Support for presentation in pdf and word format.</p> <p>Gun placement &amp; trajectory algorithm to identify effective ranges and hit locations</p> <p>Integration of sun &amp; moon almanac</p> <p>Automatic best route feature for cross country navigation omitting the no-go areas</p> <p>GPS Integration</p>
Integrated Map Data & Content	<p>Base data for the entire India at 30 meters resolution or better as per the requirement of the end user.</p> <p>The package should have terrain based true color balanced satellite imagery at 30 meters of elevation data for entire India and 200 Kms beyond International Border with India.</p> <p>Two high resolution terrain or more (as per requirement of the users) of 10 km x 10 km (area will be specified during order finalization) with elevation data of 30 meters or better spacing with appropriate 3D models for the same</p> <p>Digital Vector Map of India, scale 1:250000 or better, data comprising of the following:-</p> <p>Administrative boundaries</p> <p>Town &amp; Villages</p> <p>Highways, roads</p> <p>Railways and station</p>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	Models & textures library- Trees – About 10 variety found in the Himalayan Range 100 different tree models of common Indian trees. 100 types of Huts/Building in the Himalayan ranges and Urban Buildings (India, Tibet, China) Characters like Human, Police & Paramilitary. Army. Civilian, Terrorist, Some animals Vehicles, Aircrafts, Helicopters Textures like Tracks, Glacier lake, Glacier, Forest, Broken ground
Vector Data Support	All the DGN tags and fields should be imported properly as per Indian Army DGN files. Support for the following formats for vector data: ESRI Shape file Microstation DGN file IHO S-57 (ENC) Support for data files in various coordinate systems and conversions to a uniform coordinate system.
Raster	Capability to open Raster (Topo Sheet or Satellite Map)
Dictionary	The module should have Data Dictionary with important map features as per Survey of India/CAMS
Other features in dictionary	The data dictionary amongst may attributes has well defined cartographic and military symbols, font styles and linkage to 3D symbols in open flight format, wherever possible
Digitization	User should be able to load graphical image maps and extract vector content from it.
Doctoring of Terrain	The user should be able to doctor a terrain to add features like DCB or dunes etc
Export	Should allow data to be exported as cache which carries an xml format file through which data cached data can be loaded again.
Library	The module should have a library of 3D Models & textures: Trees – About 10 variety 100 different tree models of common Indian trees. 100 types of Huts/Building in the Himalayan ranges and Urban Buildings Characters like Human, Police & Paramilitary. Army. Civilian, Terrorist, Some animals etc Vehicles, Aircrafts, Helicopters Textures like Tracks, Glacier lake, Glacier, Forest, Broken ground etc
Military symbols	All regularly used military symbols should be available in 2D format
O/p	Feature to compress the imagery in compressed .ecw file format and vectors in popular GIS formats
Visualization feature	Support for visualization of geospatial world as a single 3D terrain (similar to Google earth) Vector layers should be visualized by draping in 3D over the underlying terrain. Place- marks should be displayed at the using screen oriented text located at accurate positions in 3D. Landmarks should be displayed at the correct location on the terrain as 3D models along with associated information. Celestial bodies including sun, Moon and Stars should be displayed at correct locations in 3D. Weather conditions including clouds, rain, snow and fog should be displayed realistically along with the rest of the 3D database. Natural features such as rivers and ponds should be displayed in 3D as well as 2D. The features should be draped over the 3D terrain. Manmade features should be displayed in 3D as well as using their corresponding 2D symbols. Hyperlinks should be displayed at the accurate locations using intuitive symbols. Interactive performance with increasing data load (60 Hz) Support for display of latitude, longitude and height above mean sea level, under the mouse pointer.

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	Display of MGRS coordinates under mouse pointer. Support for tour recording and playback. User should be able to record topographic tour, building inside tour. Support for hyper-linking recorded tours with narrative presentation.
Terrain rendering	Support for instant loading of Elevation data on the fly to generate 3D Terrain.
Terrain changes	Dynamic change of terrain. Ability to create ditches, ponds, dunes.
Natural Feature marking	Support for marking natural features using GUI including rivers and canals, ponds and lakes, forest and vegetation, border fencing, roads, bridges, electric and telephone poles.
Image generation	Support for on the fly loading and caching of data into tiled format for faster loading and rendering.
Extruding from footprints	Capability to extrude millions of 2-D footprints into 3-D buildings with textures and scattered rooftop features from shape vector files
Environment simulation	Support for turning on/off the environmental parameters including Celestial bodies like Sun, Moon and Stars and their light effects.
Atmospheric conditions	like clouds, fog, haze, visibility, rain, snow to be simulated including 3D volumetric clouds
Time/day	Any time of Day/year should be able to commanded by the control order/instructor with a resolution of one second
Sensor Simulation	Capability for simple sensor simulations for FLIR & Night Vision (Optional)
Elevation data	Analyzes and colorizes elevation data in real-time for Slope, Elevation, and Contours
Language control	Interactively modify the XML control language graphically to change how the 3-D scene is represented from the source data
Attribute data	Support for viewing and editing of attribute data
Shaders	Use shaders for realistic particle simulation effects such as control of smoke, contrails, wakes, brownout, dust clouds, explosions, and other animations
Points	Light points with support for light pools placed in real-time
Stereo display	The IG software should support Stereo Displays (passive and active) without any additional changes in models, terrain or software components
Master Creation	The administrative module should provide menus (in docking pane) for creation of masters of various types: Orbat – Hierarchy & Names (Own, Enemy & Friendly), Communication, Jammers, Sensors, Weapons, Data Processor, Weapon Systems, Munitions, & Platforms
Repository of Maps & Terrain	Maps and terrain data should be available on a storage server and integrated to be used with Sand Model Software.
Security & Administrative Features	User authentication, creations of users, password, data access permissions etc
Orbat Creation	The orbat creation should allow for creation of multiple parties, hierarchies and details. The hierarchy should appear in a tree view thereby allowing for an easy creation and viewing. Option to load orbat with resources with men and weapons etc and associate with 2D and 3D symbols should also be provided
Exercise Creation	The exercise server should also allow creating of exercise master and allow its configuration based on terrain & maps as well as assigning orbat to an exercise.
Backup	The software should allow backup of any exercise based on access control

Software Feature List for Control Order or Instructor System

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

Features	Specifications
Sync	All the creator and planner data should be synced with instructor
Setting a New Exercise	Should be able to create new exercise either by creating a new one, editing created one or copying a created one. Should not be able to modify a conducted exercise
User Creation	Users (no, name and password) Assigning of Orbat to syndicates
Deployment & Assignment	The software should allow the initial deployment of orbat and its assignment to different syndicates/users.  Control Order should be able to control visibility of resources to the syndicates in the following manner:- Syndicates can see resources assigned to others. Syndicates cannot see resources assigned to others. Syndicates can see global resources Syndicates cannot see global resources
Instructions & Responses	This pane should allow for entering descriptive information for the exercise and the instructions to the syndicates. hyperlinking of text on maps for easy retrieval and referencing by syndicates. Instructor should also be able to copy and paste from a normal ms office word file. Instructor should also be able to view responses from each syndicate in an adjoining tab and based on a drop down list of syndicates
Overlays	The software should include commonly used military symbols in bitmap format and the user should be able to mark these as an overlay together with vector features (point, line, polygons and text). The software should allow for overlays to be send to all or selected syndicates.
Route of Advance	The orbat (own, enemy and friendly) which has already been created with the administrative module should be available in a hierarchical tree format for an easy drag and drop onto the map for deployment and further movement with timelines. The further movement should be simple right click on the symbol displayed on the map and a click on next position for its movement. Automatic best route feature for cross country navigation omitting the no-go areas
Dynamic Changes	Control order should be able to view changes made to deployment and route of advance in a near real time mode.
Grid Analysis	Line of sight, Weapon Range, Viewshed analysis Find highest point within an area Flexible query on grid file
Dynamic and Interactive control of Image Generator (3D Visualization) from Control Order system	Click on the 2d map on the control order system and its simultaneous 3D display on the Image Generator 360 degree view of any point clicked on the 2d map Interactive and dynamic Change in date, time and weather conditions based on an exercise setting Introduction to the Sand Model Simultaneous animation of route of advance based on inputs of all syndicates that were created independently and its visualization from any view point Visualization of deployments made by the syndicates with available 3D models
2D Map Toolsets	Zoom in-out, pan Grid referencing Automatic retrieval based on map hyperlink Calculate distance between points Drag and drop a weapon and based on attribute range display the same on the map

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	Gun placement & trajectory algorithm feature Info button to extract information for all vital features like DCB, canal, roads, rivers etc with type, class, width, depth etc wherever feasible Moon table based on current/proposed dates and map selection And all Standard GIS features
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Software Feature List for Syndicates

Features	Specifications
Number of syndicates	Support for a minimum of 5 syndicates
Sync	All the planner data should be synced with instructor
Selecting an Exercise	Should be able to select an exercise that has been created by the control order
Deployment	The software should allow syndicate to deploy its own orbat and load/configure the assigned resource etc
Responses	Syndicates should be able to view instructions set by the Control Order and also respond to the same and upload the same onto the exercise server. This pane should allow for entering descriptive information as a response. Feature should also allow for hyper linking of text in the docking pane to maps for emphasising by the syndicate.
Syndicate Responses	Terrain Analysis, markings & noting Responses as per each topic, requirement and question put forward by the Instructor with hyper link on the map, pictures etc Deployment of own resources based on enemy's known and appreciated deployment/dispositions on the digital map together with time lines and notes The syndicate module allows for an integrated and interactive view of instructor narrative and requirements both in terms of a narration as well as hyperlink on map.
Overlays	The software should include commonly used military symbols in bitmap format and the user should be able to mark these as an overlay together with vector features (point, line, polygons and text). The software should allow for overlays to be send to all or selected users
Route of Advance	The orbat (own, enemy and friendly) which has already been created with the administrative module should be available in a hierarchical tree format for an easy drag and drop onto the map for deployment and further movement with timelines. The further movement should be simple right click on the symbol displayed on the map and a click on next position for its movement.  Automatic best route feature for cross country navigation omitting the no-go areas
Dynamic Changes	Control order should be able to view changes made to deployment and route of advance in a near real time mode if made or initiated by the control order for his assigned orbat
Grid Analysis	Line of sight, Weapon Range, View shed analysis Find highest point within an area Flexible query on grid file
Dynamic and Interactive control of Image Generator (3D Visualization) from Control Order system	Click on the 2d map on the control order system and its simultaneous 3D display on the Image Generator 360 degree view of any point clicked on the 2d map Interactive and dynamic Change in date, time and weather conditions based on an exercise setting Introduction to the Sand Model Simultaneous animation of route of advance based on inputs of all syndicates that were created independently and its visualization from any view point Visualization of deployments made by the syndicates with available 3D models However during the conduct of an exercise this feature may be disabled by the

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	control order so that it does not conflict with the conduct of the exercise.
2D Map Toolsets	Zoom in-out, pan Grid referencing Automatic retrieval based on map hyperlink Calculate distance between points Drag and drop a weapon and based on attribute range display the same on the map Gun placement & trajectory algorithm feature Info button to extract information for all vital features like DCB, canal, roads, rivers etc with type, class, width, depth etc wherever feasible Moon table based on current/proposed dates and map selection And all Standard GIS features

Software Feature List for multi-user collaboration

Features	Specifications
Type	Independent as well as an integrated component
No Menu Only Floating Tool Buttons	The collaborative module is driven based on the current exercise that is set by the instructor/control order. Its driven by a floating button pad that can be easily moved from one location of the screen to another and shared between different users assembled around the table. Ease of use is the main feature desired at the collaborative table
Interaction	Touch screen interaction with the floating tool button to perform various functionalities associated with each button and interaction based on different gestures. Also interaction based on physical coded miniature model for a lively interaction and visual display.
Tool Button features	Zoom in – user should be able to zoom on the digital map with an outward movement on the touch screen Zoom in – user should be able to zoom in with inward movement on the touch screen Detailing – user should be able to just mark with his fingers on the map the area he wish to detail and that area should zoom into Easy touch screen pan of map Info tool to extract information on any vector dataset Click on any area of map and extract the military grid referencing Type in the military grid and the map should zoom onto that area/location Calculate distance on two or multiple clicks Moon Table almanac Find height of any location and on continuous movement on the screen Line of sight with the to/from height increase/decrease required to make it visible 360 degree view shed analysis Automatic view shed creation whenever any weapon id deployed from the database stored in the exercise sever Query the height table and the vector dataset to locate area for helipad, weapon siting etc Weapon placement and trajectory analysis View responses from different syndicates View deployment and overlays from different syndicates Overlay of one syndicate deployment on another would be possible so as to carry out an interactive discussion. And all Standard GIS features
Synchronization	Dynamic display of real time scene through the Image Generator with controls available in the collaborative module: Change of view location based on zoom etc Change of view-points based on Military Grid referencing Dynamic real time date and time with Sun and moon modeled with the correct size and position and should move in accordance with a validated ephemeris model and sun and moon models Animated sequence of a syndicate response (orbit deployment and route of advance plus overlays) based on dynamic real time date and time and weather parameters like Clouds Rain or Snow

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	Visibility Wind speed and directions
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Integrated Content database &amp; Map Data integration features

Features	Specifications
Integrated Map Data & Content	<p>Base data for the entire world at 30 meters resolution or better as per the requirement of the end user.</p> <p>The package should have terrain based True colour balanced satellite imagery at 30 meters of elevation data for entire India and 200 Kms beyond International Border with India.</p> <p>Two or more high resolution terrain (as per requirement of the end users) of 10 km x 10 km (area will be specified during order finalization) with elevation data of 30 meters or better spacing with appropriate 3D models for the same</p> <p>Digital Vector Map of India, scale 1:250000 or better, along the Border &amp; data comprising of the following:-</p> <p>Administrative boundaries Water bodies Town &amp; Villages Highways, roads etc Railways and station etc Models &amp; textures library Trees – About 10 variety found in the Himalayan Range About 100 varieties of commonly found trees in India. 100 types of Huts/Building in the Himalayan ranges and Urban Buildings (India, Tibet, China) Characters like Human, Police &amp; Paramilitary. Army. Civilian, Terrorist, Some animals etc Vehicles, Aircrafts, Helicopters Textures like Tracks, Glacier lake, Glacier, Forest, Broken ground etc</p>
Survey & Mapping Tool Kit	<ol style="list-style-type: none"> <li>1. Support for various field survey devices on various data transfer protocols (Bluetooth, Serial Port, Wi-fi, LAN)</li> <li>2. Support for online update from field survey devices</li> <li>3. Supported on Tablets and Mobile Devices</li> <li>4. Support for creating data capture templates</li> <li>5. Support for data import and management of GIS layers</li> <li>6. Filters for processing GIS data and metadata</li> <li>7. Support for mapping imported data from archive</li> <li>8. Support for format conversion for optimal cross platform loading</li> <li>9. Support for custom Icons, Labels, Styles for point symbols</li> <li>10. Support for Line, Multiline, Line loops, with user defined color and styles</li> <li>11. Offset and Rotary Cloning of Symbols</li> <li>12. Facility to define map scale and clutter removal</li> <li>13. Alignment of Labels and Symbols on user defined patterns</li> </ol>

**83. Front projection based 2 channel seamless Video wall System : Entry level configuration****SME 1248133**

Seamless video wall features:

S. No.	Feature	Specification
1.	Image Size (Seamless)	Width x height >= 5.03m x 1.67m
2.	Type	Single piece soft fabric screen
3.	Projection supported	Front projection
4.	Gain	0.9-1.0

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

5.	Half Gain Angle	85 degree or more
6.	Display Quality	Uniform screen material with no visible color or pattern on the screen in ambient light (without projection)

## Projection system features

S. No.	Feature	Specification
1.	Configuration matrix	2 x 1 in a horizontal grid
2.	Display Technology	Latest DLP Technology
3.	Brightness	7000 ANSI lumens or higher
4.	Contrast Ratio	8000: 1 or better
5.	Resolution & Refresh Rate	<b>Native</b> 2560x1600 at 60 Hz
6.	Input Signal Compatibility	<ul style="list-style-type: none"><li>- Up to 60 Hz input for resolutions varying from VGA to WUXGA (2560 x 1600)</li><li>- Multiple video decoders</li><li>- Horizontal and vertical scaling of all input resolutions below WQXGA</li></ul>
7.	Synchronization	<ul style="list-style-type: none"><li>- Frame-lock synchronization support to synchronize between multiple projectors to ensure perfect hardware assisted synchronization</li></ul>
8.	Inputs	<ul style="list-style-type: none"><li>- 2 x Display Port 1.2</li><li>- 1x Dual Link DVI</li><li>- TCP/IP for Control</li><li>- IR for control with remote</li><li>- BNC sync in, out for multichannel synchronization</li><li>- USB for firmware up-gradation</li></ul>
9.	Lens Options	<ul style="list-style-type: none"><li>- Throw Ratio of 1.2:1 or lower to be chosen based on suggested projection layout</li><li>- Tool-less lens insertion system</li><li>- Motorized horizontal and vertical offset support in both directions</li><li>- Tilt adjustment</li><li>- Multiple lens options from standard zoom to ultra wide angle zoom</li></ul>
10.	Lamp	<ul style="list-style-type: none"><li>- Dual hot swappable lamp for 100% redundancy</li><li>- 400 W or lower power UHP lamp</li><li>- Pre-aligned lamp module</li><li>- Life of 2000 hours or more on full brightness mode</li></ul>
11.	Control	<ul style="list-style-type: none"><li>- Adjustment of color and gain on individual RGB channels for color calibration</li><li>- REC 709 Compliant</li><li>- Support for display of health parameters like lamp life, lamp status, fan status and temperature status</li><li>- Support for controlling the calibration parameters through remote as well as through software over network</li></ul>
12.	Others	<ul style="list-style-type: none"><li>- IR remote (with batteries)</li><li>- User manual</li><li>- Service manual</li><li>- Lens caps</li><li>- Ceiling Projector Mount</li></ul>

## Warping and blending system features

S. No.	Feature	Specification
1.	Output Resolution	2560x1600 or higher per channel
2.	Color Processing pipeline	8 bit per color channel (RGB) or higher



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

3.	Output Support	2
4.	Control	RJ45 port for Ethernet based control
5.	Supported Operations	<ul style="list-style-type: none"> <li>- Geometry Correction</li> <li>- Edge Blending</li> <li>- Color Correction and Matching</li> <li>- Uniformity Correction and Matching</li> </ul>
6.	Interpolation Techniques	<ul style="list-style-type: none"> <li>- Lancos Interpolation</li> <li>- BiCubic Interpolation</li> <li>- Bilinear Interpolation</li> </ul>
7.	Management and Control Features	<ul style="list-style-type: none"> <li>- Should have support for storing warp, blend settings</li> <li>- Should be able to load stored warp, blend settings</li> <li>- Auto load warp, blend settings based on input resolution</li> <li>- Support for providing Extended Display Identification Data (EDID) management</li> <li>- In-built geometry correction test patterns</li> <li>- PC based control software for controlling projectors as well as warping and blending System</li> </ul>

Calibration, Maintenance and Management system features

S. No.	Feature	Specifications
1.	Device Detection and Management	<ul style="list-style-type: none"> <li>- Should automatically detect all projectors, warping and blending hardware and provide graphical user interfaces for control of these devices</li> <li>- Should provide the details of the projectors and warping hardware including make, model and status parameters etc.</li> <li>- Should allow changing the names and IP addresses of the devices as well as to create logical grouping of the devices</li> <li>- Lock/unlock access to device</li> </ul>
2.	Projector Control	<ul style="list-style-type: none"> <li>- Turning on/off projectors</li> <li>- Control the menu of the projectors for remote like operations</li> <li>- Access projector status like lamp status, lamp life remaining etc.</li> <li>- Scheduling on/off timing for the projectors</li> <li>- Providing information on critical alerts from the projectors</li> </ul>
3.	Color Calibration Control	<ul style="list-style-type: none"> <li>- Allow access to control of colors and gain on RGB channels</li> <li>- Allow setting white point of the projector</li> <li>- Allow direct capture of readings from chroma-meter and upload them on selected projectors to allow auto correction of desired color values based on measured color values</li> <li>- Allows gain matching of multiple projectors</li> <li>- Allows color matching of multiple projectors</li> <li>- Support for automatic deduction of common color gamut for multiple projectors</li> <li>- Support for loading predefined standards like D65, REC709 etc.</li> </ul>
4.	Warp and Blend Control	<ul style="list-style-type: none"> <li>- Support for defining geometry warping grid</li> <li>- Support for changing colors of warp control points and grid lines</li> <li>- Support for multiple image interpolation options</li> <li>- Support for defining overlap pixels, blend shapes and location</li> <li>- Support for changing colors of blend area control points and grid lines</li> <li>- Support for blend curve control for smooth edge blending</li> <li>- Support for defining mask areas</li> <li>- Support to add, delete, copy, paste warps, blends and masks</li> <li>- Support for save, load from/to hardware device and to an external PC</li> </ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>- Support for anti-aliasing filtering</li> <li>- Support for sharpness filtering</li> <li>- Support for real-time preview of test images by changing warp and blend parameter</li> </ul>
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Video Wall Processor (VWP) features

S.No.	Specification
	<b>Video Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.
5.	No. of Outputs: 2 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 8 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6” or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8” or larger wireless multi-touch controller with Video Wall Processor pre-installed
	<b>Video Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**84. Rear projection based 3 channel seamless Video wall System: Mid end configuration****SME 1248134**

Seamless video wall features:

S. No.	Feature	Specification
1.	Image Size (Seamless)	Arc Length x Height > = 5.75m x 1.38m
2.	Type	Single piece with semi rigid fire retardant acrylic base
3.	Projection supported	Rear projection
4.	Gain	0.5 - 0.7
5.	Half Gain Angle	70 degree or more
6.	Curvature of Screen	45-60 degrees
7.	Frame	Curved frame with matte black velvet finish.
8.	Display Quality	Uniform screen material with no visible color or pattern on the screen in ambient light (without projection)

Projection system features

S. No.	Feature	Specification
1.	Configuration matrix	3 x 1 in a horizontal grid
2.	Display Technology	Latest DLP Technology
3.	Brightness	7000 ANSI lumens or higher
4.	Contrast Ratio	8000: 1 or better
5.	Resolution & Refresh Rate	<b>Native</b> 2560x1600 at 60 Hz
6.	Input Signal Compatibility	<ul style="list-style-type: none"><li>- Up to 60 Hz input for resolutions varying from VGA to WUXGA (2560 x 1600)</li><li>- Multiple video decoders</li><li>- Horizontal and vertical scaling of all input resolutions below WQXGA</li></ul>
7.	Synchronization	<ul style="list-style-type: none"><li>- Frame-lock synchronization support to synchronize between multiple projectors to ensure perfect hardware assisted synchronization</li></ul>
8.	Inputs	<ul style="list-style-type: none"><li>- 2 x Display Port 1.2</li><li>- 1x Dual Link DVI</li><li>- TCP/IP for Control</li><li>- IR for control with remote</li><li>- BNC sync in, out for multichannel synchronization</li><li>- USB for firmware up-gradation</li></ul>
9.	Lens Options	<ul style="list-style-type: none"><li>- Throw Ratio of 0.8:1 or lower to be chosen based on suggested projection layout</li></ul>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>- Tool-less lens insertion system</li> <li>- Motorized horizontal and vertical offset support in both directions</li> <li>- Tilt adjustment</li> <li>- Multiple lens options from standard zoom to ultra wide angle zoom</li> </ul>
10.	Lamp	<ul style="list-style-type: none"> <li>- Dual hot swappable lamp for 100% redundancy</li> <li>- 400 W or lower power UHP lamp</li> <li>- Pre-aligned lamp module</li> <li>- Life of 2000 hours or more on full brightness mode</li> </ul>
11.	Control	<ul style="list-style-type: none"> <li>- Adjustment of color and gain on individual RGB channels for color calibration</li> <li>- REC 709 Compliant</li> <li>- Support for display of health parameters like lamp life, lamp status, fan status and temperature status</li> <li>- Support for controlling the calibration parameters through remote as well as through software over network</li> </ul>
12.	Others	<ul style="list-style-type: none"> <li>- IR remote (with batteries)</li> <li>- User manual</li> <li>- Service manual</li> <li>- Lens caps</li> <li>- Rear Projector Mount</li> </ul>

Warping and blending system features

S. No.	Feature	Specification
1.	Output Resolution	2560x1600 or higher per channel
2.	Color Processing pipeline	8 bit per color channel (RGB) or higher
3.	Output Support	3
4.	Control	RJ45 port for Ethernet based control
5.	Supported Operations	<ul style="list-style-type: none"> <li>- Geometry Correction</li> <li>- Edge Blending</li> <li>- Color Correction and Matching</li> <li>- Uniformity Correction and Matching</li> </ul>
6.	Interpolation Techniques	<ul style="list-style-type: none"> <li>- Lancos Interpolation</li> <li>- BiCubic Interpolation</li> <li>- Bilinear Interpolation</li> </ul>
7.	Management and Control Features	<ul style="list-style-type: none"> <li>- Should have support for storing warp, blend settings</li> <li>- Should be able to load stored warp, blend settings</li> <li>- Auto load warp, blend settings based on input resolution</li> <li>- Support for providing Extended Display Identification Data (EDID) management</li> <li>- In-built geometry correction test patterns</li> <li>- PC based control software for controlling projectors as well as warping and blending System</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

## Calibration, Maintenance and Management system features

S. No.	Feature	Specifications
1.	Device Detection and Management	<ul style="list-style-type: none"><li>- Should automatically detect all projectors, warping and blending hardware and provide graphical user interfaces for control of these devices</li><li>- Should provide the details of the projectors and warping hardware including make, model and status parameters etc.</li><li>- Should allow changing the names and IP addresses of the devices as well as to create logical grouping of the devices</li><li>- Lock/unlock access to device</li></ul>
2.	Projector Control	<ul style="list-style-type: none"><li>- Turning on/off projectors</li><li>- Control the menu of the projectors for remote like operations</li><li>- Access projector status like lamp status, lamp life remaining etc.</li><li>- Scheduling on/off timing for the projectors</li><li>- Providing information on critical alerts from the projectors</li></ul>
3.	Color Calibration Control	<ul style="list-style-type: none"><li>- Allow access to control of colors and gain on RGB channels</li><li>- Allow setting white point of the projector</li><li>- Allow direct capture of readings from chroma-meter and upload them on selected projectors to allow auto correction of desired color values based on measured color values</li><li>- Allows gain matching of multiple projectors</li><li>- Allows color matching of multiple projectors</li><li>- Support for automatic deduction of common color gamut for multiple projectors</li><li>- Support for loading predefined standards like D65, REC709 etc.</li></ul>
4.	Warp and Blend Control	<ul style="list-style-type: none"><li>- Support for defining geometry warping grid</li><li>- Support for changing colors of warp control points and grid lines</li><li>- Support for multiple image interpolation options</li><li>- Support for defining overlap pixels, blend shapes and location</li><li>- Support for changing colors of blend area control points and grid lines</li><li>- Support for blend curve control for smooth edge blending</li><li>- Support for defining mask areas</li><li>- Support to add, delete, copy, paste warps, blends and masks</li><li>- Support for save, load from/to hardware device and to an external PC</li><li>- Support for anti-aliasing filtering</li><li>- Support for sharpness filtering</li><li>- Support for real-time preview of test images by changing warp and blend parameter</li></ul>

## Video Wall Processor (VWP) features

S.No.	Specification
	<b>Video Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

5.	No. of Outputs: 3 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 12 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6” or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8” or larger wireless multi-touch controller with Video Wall Processor pre-installed
	<b>Video Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

**85. Rear projection based 6 channel seamless Video wall System: High end configuration**

**SME 1248135**

Seamless video wall features:

S. No.	Feature	Specification
1.	Image Size (Seamless)	Arc Length x Height $\geq$ (5.43m x 2.32m) $\pm$ 5% Variation
2.	Type	Single piece with semi rigid fire retardant acrylic base
3.	Projection supported	Rear projection
4.	Gain	0.5 - 0.7
5.	Half Gain Angle	70 degree or more
6.	Curvature of Screen	45-60 degrees
7.	Frame	Curved frame with matte black velvet finish.
8.	Display Quality	Uniform screen material with no visible color or pattern on the screen in ambient light (without projection)

Projection system features

S. No.	Feature	Specification
1.	Configuration matrix	3 x 2 in a horizontal and vertical matrix
2.	Display Technology	Latest DLP Technology
3.	Brightness	7000 ANSI lumens or higher
4.	Contrast Ratio	8000: 1 or better
5.	Resolution & Refresh Rate	<b>Native</b> 2560x1600 at 60 Hz
6.	Input Signal Compatibility	<ul style="list-style-type: none"> <li>- Up to 60 Hz input for resolutions varying from VGA to WUXGA (2560 x 1600)</li> <li>- Multiple video decoders</li> <li>- Horizontal and vertical scaling of all input resolutions below WQXGA</li> </ul>
7.	Synchronization	<ul style="list-style-type: none"> <li>- Frame-lock synchronization support to synchronize between multiple projectors to ensure perfect hardware assisted synchronization</li> </ul>
8.	Inputs	<ul style="list-style-type: none"> <li>- 2 x Display Port 1.2</li> <li>- 1x Dual Link DVI</li> <li>- TCP/IP for Control</li> <li>- IR for control with remote</li> <li>- BNC sync in, out for multichannel synchronization</li> <li>- USB for firmware up-gradation</li> </ul>
9.	Lens Options	<ul style="list-style-type: none"> <li>- Throw Ratio of 0.8:1 or lower to be chosen based on suggested projection layout</li> <li>- Tool-less lens insertion system</li> <li>- Motorized horizontal and vertical offset support in both directions</li> <li>- Tilt adjustment</li> <li>- Multiple lens options from standard zoom to ultra wide angle zoom</li> </ul>
10.	Lamp	<ul style="list-style-type: none"> <li>- Dual hot swappable lamp for 100% redundancy</li> <li>- 400 W or lower power UHP lamp</li> <li>- Pre-aligned lamp module</li> <li>- Life of 2000 hours or more on full brightness mode</li> </ul>
11.	Control	<ul style="list-style-type: none"> <li>- Adjustment of color and gain on individual RGB channels for color calibration</li> <li>- REC 709 Compliant</li> <li>- Support for display of health parameters like lamp life, lamp status, fan</li> </ul>



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		<ul style="list-style-type: none"> <li>status and temperature status</li> <li>- Support for controlling the calibration parameters through remote as well as through software over network</li> </ul>
12.	Others	<ul style="list-style-type: none"> <li>- IR remote (with batteries)</li> <li>- User manual</li> <li>- Service manual</li> <li>- Lens caps</li> <li>- Rear Projector Mount</li> </ul>

Warping and blending system features

S. No.	Feature	Specification
1.	Output Resolution	2560x1600 or higher per channel
2.	Color Processing pipeline	8 bit per color channel (RGB) or higher
3.	Output Support	6
4.	Control	RJ45 port for Ethernet based control
5.	Supported Operations	<ul style="list-style-type: none"> <li>- Geometry Correction</li> <li>- Edge Blending</li> <li>- Color Correction and Matching</li> <li>- Uniformity Correction and Matching</li> </ul>
6.	Interpolation Techniques	<ul style="list-style-type: none"> <li>- Lancos Interpolation</li> <li>- BiCubic Interpolation</li> <li>- Bilinear Interpolation</li> </ul>
7.	Management and Control Features	<ul style="list-style-type: none"> <li>- Should have support for storing warp, blend settings</li> <li>- Should be able to load stored warp, blend settings</li> <li>- Auto load warp, blend settings based on input resolution</li> <li>- Support for providing Extended Display Identification Data (EDID) management</li> <li>- In-built geometry correction test patterns</li> <li>- PC based control software for controlling projectors as well as warping and blending System</li> </ul>

Calibration, Maintenance and Management system features

S. No.	Feature	Specifications
1.	Device Detection and Management	<ul style="list-style-type: none"> <li>- Should automatically detect all projectors, warping and blending hardware and provide graphical user interfaces for control of these devices</li> <li>- Should provide the details of the projectors and warping hardware including make, model and status parameters etc.</li> <li>- Should allow changing the names and IP addresses of the devices as well as to create logical grouping of the devices</li> <li>- Lock/unlock access to device</li> </ul>
2.	Projector Control	<ul style="list-style-type: none"> <li>- Turning on/off projectors</li> <li>- Control the menu of the projectors for remote like operations</li> <li>- Access projector status like lamp status, lamp life remaining etc.</li> <li>- Scheduling on/off timing for the projectors</li> <li>- Providing information on critical alerts from the projectors</li> </ul>
3.	Color Calibration Control	<ul style="list-style-type: none"> <li>- Allow access to control of colors and gain on RGB channels</li> <li>- Allow setting white point of the projector</li> <li>- Allow direct capture of readings from chroma-meter and upload them</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

		on selected projectors to allow auto correction of desired color values based on measured color values - Allows gain matching of multiple projectors - Allows color matching of multiple projectors - Support for automatic deduction of common color gamut for multiple projectors - Support for loading predefined standards like D65, REC709 etc.
4.	Warp and Blend Control	- Support for defining geometry warping grid - Support for changing colors of warp control points and grid lines - Support for multiple image interpolation options - Support for defining overlap pixels, blend shapes and location - Support for changing colors of blend area control points and grid lines - Support for blend curve control for smooth edge blending - Support for defining mask areas - Support to add, delete, copy, paste warps, blends and masks - Support for save, load from/to hardware device and to an external PC - Support for anti-aliasing filtering - Support for sharpness filtering - Support for real-time preview of test images by changing warp and blend parameter

Video Wall Processor (VWP) features

S.No.	Specification
	<b>Video Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 Hz.
5.	No. of Outputs: 6 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 12 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6” or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8” or larger wireless multi-touch controller with Video Wall Processor pre-installed
	<b>Video Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

	sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**86. LED panel based Integrated Data Wall System: Entry Level configuration      SME 1248136**

S. No.	Feature	Specification
1.	Configuration	2x2 with standard wall-mount
2.	LCD technology	S-PVA, normally black
3.	Resolution	Full HD (1920 x 1080) or higher
4.	Backlight	Direct LED
5.	Aspect Ratio	16:9
6.	Pixel density	48 dpi
7.	Refresh rate	60 Hz
8.	Luminance	450 cd/m <sup>2</sup> (typ.) or higher
9.	Contrast	3500:1 (typ.) or higher
10.	Viewing angle	H 178° V 178°
11.	White point	10,000 K
12.	Color	10 bits - 1.07 B colors
13.	Color calibration	Manual (by eye) calibration
14.	Precision	Internal 10 bit processing
15.	Backlight lifetime	60,000 h (typ)
16.	MTBF	100,000 h (half brightness)
17.	Active screen diagonal	46" (1168 mm) or larger

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

18.	Dimensions	1024.0 x 578.6 x 98.2 mm   40.3" x 22.8" x 3.9"
19.	Active screen area	1018.1 mm x 572.7 mm   40.1" x 22.6"
20.	Bezel width	Right, bottom: 1.9 mm   0.075" Left, top: 3.8 mm   0.13" Total: 5.7 mm   0.21" or smaller
21.	Weight	26 kg   57.3 lbs (net) 36 kg   79.4 lbs (gross)
22.	Cooling	Low noise fans
23.	AC input voltage	100-240 VAC, 50-60 Hz
24.	Power consumption	190 W (max)   90 W (typ)   20 W (sleep)   2.5 W (stdby)
25.	Heat dissipation	819 BTU/h (max)
26.	DVI	Single link DVI-D in/out with HDCP Resolution: (60Hz): 640x480, 800x600, 1024x768, 1280x1024, 1360x768, 1920x1200, 720p60, 1080p60; 1080p24, 1080p25, 1080p30, 1080p50
27.	Remote Control	External dongle with approx. 1m 3.5mm Stereo Male to IR Receiver
28.	Control signal	RS-232 DSUB9 in/out
29.	Operating humidity	20-80%, non-condensing
30.	Operational temperature	0 - 45°C   32 - 109°F
31.	Storage humidity	10-90%, non-condensing

Data Wall Processor (DWP) features

S.No.	Specification
	<b>Data Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.
5.	No. of Outputs: 4 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 8 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8" or larger wireless multi-touch controller with Data Wall Processor pre-installed
	<b>Data Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the data wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the DWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

6.	Support for controlling all DWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the DWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**87. LED panel based Integrated Data Wall System: Mid Level configuration**

**SME 1248137**

S. No.	Feature	Specification
1.	LCD technology	IPS
2.	Resolution	Full HD (1920 x 1080) or higher
3.	Backlight	Direct LED
4.	Aspect Ratio	16:9
5.	Pixel density	40 dpi
6.	Refresh rate	60 Hz
7.	Luminance	500 cd/m <sup>2</sup> (typ.) or higher
8.	Contrast	1400:1 (typ.) or higher 500000:1 (dynamic) or higher
9.	Viewing angle	H 178°   V 178°
10.	Screen haze	10%
11.	White point	10,000 K
12.	Color depth	10 bits
13.	Calibration	Automatic color and brightness calibration – without using external color meters/sensors

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

14.	Precision	Internal 10 bit processing
15.	Backlight lifetime	60,000 h (typ) or better
16.	MTBF	100,000 h (half brightness)
17.	Cooling	Ultra low noise fans
18.	Dimensions	1213 x 684 x 98.2 mm   47.8" x 26.9" 3.87"
19.	Active screen diagonal	54.6" (1388 mm)
20.	Active screen area	1210 mm x 680 mm   47.63" x 26.79"
21.	Weight	29.8 kg
22.	Bezel width	3.5 mm   0.14"
23.	Display port 1.1	1 input, 1 output or more
24.	Ethernet port	2
25.	HDCP	Yes
26.	HDMI 1.4a	1 input
27.	USB	1 input (USB 2.0)
28.	DVI	2 inputs
29.	Calibration	Built in automatic color and brightness calibration without using external color meters/sensors
30.	Remote Control	External dongle with approx. 1m 3.5mm Stereo Male to IR Receiver
31.	OPS Open Pluggable Specification	Yes
32.	Energy Star	Yes
33.	AC input voltage	100-240 VAC, 50-60 Hz
34.	Power consumption	290 W (max)   180 W (typ)

Data Wall Processor (DWP) features

S.No.	Specification
	<b>Data Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.
5.	No. of Outputs: 4 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 8 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

14.	8" or larger wireless multi-touch controller with Data Wall Processor pre-installed
	<b>Data Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the data wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the DWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all DWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the DWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the DWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**88. LED panel based Integrated Data Wall System: High end configuration**

**SME 1248138**

S. No.	Feature	Specification
1.	LCD technology	SPVA
2.	Resolution	Full HD (1920 x 1080) or higher
3.	Backlight	Direct LED
4.	Aspect Ratio	16:9
5.	Pixel density	40 dpi
6.	Refresh rate	60 Hz
7.	Luminance	700 cd/m <sup>2</sup> (typ.) or higher
8.	Contrast	3500:1 (typ.) or higher

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

9.	Viewing angle	H 178°   V 178°
10.	White point	10,000 K
11.	Color depth	10 bits
12.	Calibration	Built in automatic color and brightness calibration- without using external color meters/sensors
13.	Precision	Internal 10 bit processing
14.	Backlight lifetime	60,000 h (typ)
15.	MTBF	100,000 h (half brightness)
16.	Cooling	Ultra low noise fans
17.	Screen haze	44%
18.	Dimensions	1213 x 684 x 98.2 mm   47.8" x 26.9" x 3.87"
19.	Active screen diagonal	54.6" (1388 mm)
20.	Active screen area	1210 mm x 680 mm   47.63" x 26.79"
21.	Weight	29.2 kg
22.	Bezel width	3.5 mm   0.14" or smaller
23.	Display port 1.1	1 input, 1 output or more
24.	Ethernet port	2
25.	HDCP	Yes
26.	HDMI 1.4a	1 input or more
27.	USB	1 input (USB 2.0)
28.	DVI	2 inputs or more
29.	Remote Control	External dongle with approx. 1m 3.5mm Stereo Male to IR Receiver
30.	OPS Open Pluggable Specification	Yes
31.	Energy Star	Yes
32.	AC input voltage	100-240 VAC, 50-60 Hz
33.	Power consumption	290 W (max)   180 W (typ)

Data Wall Processor (DWP) features

S.No.	Specification
	<b>Data Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support torunning a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.
5.	No. of Outputs: 4 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 8 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8" or larger wireless multi-touch controller with Data Wall Processor pre-installed
	<b>Data Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the data wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the DWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all DWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the DWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the DWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**89. Video Wall Processor (VWP) for small conference rooms, meeting rooms**

**SME 1248139**

S.No.	Specification
	<b>Video Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

5.	No. of Outputs: 2 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 8 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8" or larger wireless multi-touch controller with Video Wall Processor pre-installed
	<b>Video Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**90. Video Wall Processor (VWP) for mid size NOC, collaboration rooms****SME 1248140**

S.No.	Specification
	<b>Video Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 Hz.
5.	No. of Outputs: 4 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 8 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8" or larger wireless multi-touch controller with Video Wall Processor pre-installed
	<b>Video Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**91. Video Wall Processor (VWP) for mid size control rooms****SME 1248141**

S.No.	Specification
<b>Video Wall Processor Hardware</b>	
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 Hz.
5.	No. of Outputs: 6 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 12 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8" or larger wireless multi-touch controller with Video Wall Processor pre-installed
<b>Video Wall Processor Software</b>	
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**92. Video Wall Processor (VWP) for large size control rooms, NOC****SME 1248142**

S.No.	Specification
	<b>Video Wall Processor Hardware</b>
1.	Capability to create one large single seamless display on multiple operating systems like Windows and Linux
2.	Support for running a selected visualization application natively in full resolution of the display as well as in 3D, without scaling
3.	Modular hardware allowing scaling of inputs as required in future by adding expansion chassis
4.	The processor should also allow using a single display of the video wall in active Stereo up-to 2560x1600 @ 120 hz.
5.	No. of Outputs: 8 Dual DVI/Display Port (Each Supporting Resolution of 2560x1600 @ 60 Hz or higher) and support for 3D
6.	No. of Inputs: 16 HDMI (Each Supporting Resolution of 1920x1200 or higher)
7.	1 TB Storage Space – For Video Archival
8.	Intel 8 Core Xeon 3.0 GHz or Better
9.	16 GB of System Memory
10.	2 or More Gigabit LAN Ports
11.	1 Wireless Keyboard, 1 Wireless Optical Mouse
12.	Redundant Power Supply; Rack Mount Kit
13.	Integrated 3.6" or more touch based display panel on the processor hardware for showing preview of input sources, and vital system stats
14.	8" or larger wireless multi-touch controller with Video Wall Processor pre-installed
	<b>Video Wall Processor Software</b>
1.	Support for implementing any change to the layout made via the controller software should reflect in the output of the display wall in real-time
2.	Support for installation on devices running Android/ iOS/ Windows operating systems
3.	Auto-detection of various external input video sources connected to the VWP
4.	Drag-and-drop user-interface to move active input video sources to the main display wall.
5.	Naming and specifying position/size of various sources on the main display wall
6.	Support for controlling all VWP parameters using a simple GUI interface. The GUI interface should be hardware accelerated and provide a device-like look-and-feel.
7.	Networking capability to allow support for real-time control for positioning and size adjustment of input sources from an external workstation/multi-touch screen
8.	Support for connecting to any computer system over the local TCP/IP network running VNC servers and treating them as input video sources to the VWP. It should be possible to control the remote applications by executing local mouse/keyboard events on the VWP hardware on the remote systems.
9.	For external video sources that are PC outputs, software should have support to allow control of these sources from external PC/Display Wall/Touch Screen through mouse/gesture controls to the external

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	video sources.
10.	For external video sources that are video players with software access to play/pause video streams, the controller software should provide APIs to play/pause the video sources from external PC/Display Wall/ Touch Table.
11.	Support for defining layout presets for the entire display wall. Each preset should allow controlling the number of input sources along with the size and location of the sources on the output wall.
12.	Support for time-based switching of presets allowing different presets to become active during a user defined time interval. .
13.	Support for storing any or all of the input video/audio sources on the hard drive as a movie file for subsequent playback. The start, stop and pause operations should be controllable using an easy-to-use graphical interface.
14.	Support for storing the output of the complete display wall on the hard drive as a movie file or subsequent playback..
15.	Support for adding the current system time as a timestamp on the stored video. This time stamp should be displayed during subsequent playback on each frame.
16.	Support for cloning of video sources on the display wall
17.	Support for specifying a border width and color for video sources displayed on the wall
18.	Support for color correction and applying various image filters on the video sources
19.	Support for hardware accelerated higher-order interpolation of the video sources when scaled on the display wall.
20.	Support for Contrast and Brightness Enhancement on input video sources
21.	Support for overlaying one video source over another and doing masking operation
22.	Support for locking aspect ratio on scaled video sources

**93. Modules for customization of Video Wall Processor (VWP): Input port expansion module    SME 1248143**

S.No.	Specification
1.	Support for 4 HDMI inputs (Each Supporting Resolution of 1920x1200 or higher)
2.	Seamless compatibility with the primary chassis of 3D video wall processor
3.	Built in software detection support for the additional number of inputs

**94. Modules for customization of Video Wall Processor (VWP): Tethered large screen multi-touch Controller  
SME 1248144**

S.No.	Specification
1.	19" or larger multi-touch panel
2.	Screen Resolution: 1920 x 1080 or higher
3.	Pre-installed 3D video wall processor software
4.	The touch screen controller should be installed along with a table top screen and configured to run the entire display wall through the processor software.

**95. 16 Channel Network Video Recorder with 24TB HDD :****SME 1248145**

Functional Specifications	
	<ol style="list-style-type: none"> <li>1. Total Incoming Throughput should be minimum 260 Mbps</li> <li>2. Upto 480ips Full HD real time recording</li> <li>3. Upto 480ips Live Display</li> <li>4. With 16 ch inbuilt POE ports</li> <li>5. Should have 24TB HDD pre-installed</li> <li>6. Should be able to cascade over Network ( VMS Software )</li> <li>7. Easy to install, setup</li> </ol>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

	<ul style="list-style-type: none"> <li>8. Built in 16ch Poe Switch</li> <li>9. Expandable upto 75TB using esata Storage.</li> <li>10. Should be supplied with 24TB inbuilt HDD Capacity</li> <li>11. Support 1 click network configuration</li> <li>12. Support third party cameras over ONVIF-S</li> </ul>
<b>VIDEO</b>	System Specifications <ul style="list-style-type: none"> <li>• Video Input 16 IP Cameras</li> <li>• Incoming Throughput 260 Mbps</li> <li>• Support Cameras ONVIF -S</li> <li>• Video Outputs 1 Hdmi, 1 VGA Out</li> <li>• Screen Resolution 1920x1200, 1920x1080, 1680x1050, 1600x1200</li> <li>• Display Speed Upto 480 IPS</li> <li>• Digital Zoom x2 - x12</li> </ul>
<b>RECORDING</b>	<ul style="list-style-type: none"> <li>• Max Throughput 260 Mbps, 480 IPS @ Full HD</li> <li>• Recording Resolution Upto 8 Mpxl</li> <li>• Compression H.264</li> <li>• Recording Modes Time Lapse, Event, Pre-Event, Panic</li> <li>• Trigger Events Alarm In, Audio Detection, Motion Detection, Tripzone Tampering, Video Loss</li> </ul>
<b>Playback &amp; Storage</b>	<ul style="list-style-type: none"> <li>• Performance 4Ch Full HD synchronous Playback</li> <li>• Search Mode Time Lapse, Event Log, Motion</li> <li>• Digital Zoom x2 – x12</li> <li>• HDD SATA x6, eSata x4 ( Upto 4TB capacity for each disk</li> <li>• RAID RAID 1 Support</li> <li>• Total Capacity 75 TB or more ( 6 HDD Bays Internal )</li> <li>• Usb 2.0 x 2</li> <li>• User interface Front Buttons, Mouse, IR Remote Control, Network Remote Keyboard.</li> </ul>
<b>Operating Temp.</b>	<ul style="list-style-type: none"> <li>• Environmental Specifications</li> <li>• Operating Temperature 0° to 40°C</li> <li>• Operating Humidity Up to 90%</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>• CE</li> <li>• FCC</li> <li>• UL</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**96. 8 Channel Network Video Recorder with 16TB HDD : SME 1248146**

<b>Functional Specifications</b>	<ul style="list-style-type: none"> <li>○ Total Incoming Throughput should be minimum 180 Mbps</li> <li>○ Upto 240ips Full HD real time recording</li> <li>○ Upto 240ips Live Display</li> <li>○ With 8 ch inbuilt POE ports</li> <li>○ Should have 16TB HDD pre-installed</li> <li>○ Should be able to cascade over Network ( VMS Software )</li> <li>○ Easy to install, setup</li> <li>○ Built in 8ch Poe Switch</li> <li>○ Expandable upto 75TB using esata Storage.</li> <li>○ Should be supplied with 24TB inbuilt HDD Capacity</li> <li>○ Support 1 click network configuration</li> <li>○ Support third party cameras over ONVIF-S</li> </ul>																
<b>VIDEO</b>	<p><b>System Specifications</b></p> <table> <tr> <td>Video Input</td><td>8 IP Cameras</td></tr> <tr> <td>1. Incoming Throughput</td><td>240 Mbps</td></tr> <tr> <td>2. Support Cameras</td><td>ONVIF -S</td></tr> <tr> <td>3. Video Outputs</td><td>1 Hdmi, 1 VGA Out</td></tr> <tr> <td>4. Screen Resolution</td><td>1920x1200,1920x1080,1680x1050</td></tr> <tr> <td></td><td>1600x1200</td></tr> <tr> <td>5. Display Speed</td><td>Upto 240 IPS</td></tr> <tr> <td>6. Digital Zoom</td><td>x2 - x12</td></tr> </table>	Video Input	8 IP Cameras	1. Incoming Throughput	240 Mbps	2. Support Cameras	ONVIF -S	3. Video Outputs	1 Hdmi, 1 VGA Out	4. Screen Resolution	1920x1200,1920x1080,1680x1050		1600x1200	5. Display Speed	Upto 240 IPS	6. Digital Zoom	x2 - x12
Video Input	8 IP Cameras																
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4. Screen Resolution	1920x1200,1920x1080,1680x1050																
	1600x1200																
5. Display Speed	Upto 240 IPS																
6. Digital Zoom	x2 - x12																
<b>RECORDING</b>	<table> <tr> <td>• Max Throughput</td><td>180 Mbps, 240 IPS @ Full HD</td></tr> <tr> <td>• Recording Resolution</td><td>Upto 8 Mpxl</td></tr> <tr> <td>• Compression</td><td>H.264</td></tr> <tr> <td>• Recording Modes</td><td>Time Lapse, Event, Pre-Event, Panic</td></tr> <tr> <td>• Trigger Events</td><td>Alarm In, Audio Detection, Motion Detection, Tripzone</td></tr> <tr> <td>Tampering, Video Loss</td><td></td></tr> </table>	• Max Throughput	180 Mbps, 240 IPS @ Full HD	• Recording Resolution	Upto 8 Mpxl	• Compression	H.264	• Recording Modes	Time Lapse, Event, Pre-Event, Panic	• Trigger Events	Alarm In, Audio Detection, Motion Detection, Tripzone	Tampering, Video Loss					
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE

-A

<b>Playback &amp; Storage</b>	<ul style="list-style-type: none"> <li>• Performance 4Ch Full HD synchronous Playback</li> <li>• Search Mode Time Lapse, Event Log, Motion</li> <li>• Digital Zoom x2 – x12</li> <li>• HDD SATA x6, eSata x2 ( Upto 4TB capacity for each disk)</li> <li>• RAID RAID 1 Support</li> <li>• Total Capacity 75 TB or more ( 6 HDD Bays Internal )</li> <li>• Usb 2.0 x 2</li> <li>• User interface Front Buttons, Mouse, IR Remote Control, Network Remote Keyboard.</li> </ul>
<b>Operating Temp.</b>	<ul style="list-style-type: none"> <li>• Environmental Specifications</li> <li>• Operating Temperature 0° to 40°C</li> <li>• Operating Humidity Up to 90%</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>• CE</li> <li>• FCC</li> <li>• UL</li> </ul>

**97. 4 Channel Network Video Recorder with 16TB HDD : SME 1248147**

<b>Functional Specifications</b>	<ol style="list-style-type: none"> <li>1. Total Incoming Throughput should be minimum 84 Mbps</li> <li>2. Upto 120ips Full HD real time recording</li> <li>3. Upto 120ips Live Display</li> <li>4. With 4 ch inbuilt POE ports</li> <li>5. Should have 16TB HDD pre-installed</li> <li>6. Should be able to cascade over Network ( VMS Software )</li> <li>7. Easy to install, setup</li> <li>8. Built in 4ch Poe Switch</li> <li>9. Expandable upto 75TB using esata Storage.</li> <li>10. Should be supplied with 24TB inbuilt HDD Capacity</li> <li>11. Support 1 click network configuration</li> <li>12. Support third party cameras over ONVIF-S</li> </ol>
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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE

-A

<b>VIDEO</b>	<p align="center">System Specifications</p> <table> <tr> <td>7. Video Input</td><td>4 IP Cameras</td></tr> <tr> <td>8. Incoming Throughput</td><td>84Mbps</td></tr> <tr> <td>9. Support Cameras</td><td>ONVIF -S</td></tr> <tr> <td>10. Video Outputs</td><td>1 Hdmi, 1 VGA Out</td></tr> <tr> <td>11. Screen Resolution</td><td>1920x1200, 1920x1080, 1680x1050</td></tr> <tr> <td>12. Display Speed</td><td>Upto 84 IPS</td></tr> <tr> <td>13. Digital Zoom</td><td>x2 - x12</td></tr> </table>	7. Video Input	4 IP Cameras	8. Incoming Throughput	84Mbps	9. Support Cameras	ONVIF -S	10. Video Outputs	1 Hdmi, 1 VGA Out	11. Screen Resolution	1920x1200, 1920x1080, 1680x1050	12. Display Speed	Upto 84 IPS	13. Digital Zoom	x2 - x12				
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12. Display Speed	Upto 84 IPS																		
13. Digital Zoom	x2 - x12																		
<b>RECORDING</b>	<table> <tr> <td>(j) Max Throughput</td><td>120Mbps, 960 IPS @ Full HD</td></tr> <tr> <td>(k) Recording Resolution</td><td>Upto 8 Mpxl</td></tr> <tr> <td>(l) Compression</td><td>H.264</td></tr> <tr> <td>(m) Recording Modes</td><td>Time Lapse, Event, Pre-Event, Panic</td></tr> <tr> <td>(n) Trigger Events</td><td>Alarm In, Audio Detection, Motion Detection, Tripzone</td></tr> <tr> <td>Tampering, Video Loss</td><td></td></tr> </table>	(j) Max Throughput	120Mbps, 960 IPS @ Full HD	(k) Recording Resolution	Upto 8 Mpxl	(l) Compression	H.264	(m) Recording Modes	Time Lapse, Event, Pre-Event, Panic	(n) Trigger Events	Alarm In, Audio Detection, Motion Detection, Tripzone	Tampering, Video Loss							
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**98. Unified Scale out Storage (30TB useable on RAID 6):**

**SME 1248148**

Feature	Description
High Availability & Scale-Out Architecture	<ul style="list-style-type: none"> <li>• The storage array should support both SAN and NAS capabilities with No Single point of Failure and should provide protection against disk or node failure.</li> <li>• The array should support both Unified scale-out clustered architecture for adding capacity and performance.</li> </ul>
Scalability and Storage Operating System	<ul style="list-style-type: none"> <li>• The storage array should have Operating System Optimized for storage operations and should not be general purpose OS and it should be in the leader quadrant of Gartner. One OS Should provide both NAS &amp; SAN Functionality.</li> </ul>
Storage Controller Processor & Cache	<ul style="list-style-type: none"> <li>• The storage system should be provided with minimum two storage controllers and it should have a total of minimum 34GB effective system memory for read and write. This memory should be common for unified access for file as well as block storage.</li> <li>• It should provide the ability to protect data through de-stage/battery backup for a minimum of 72 hours in the event of a power outage.</li> </ul>

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Host Connectivity, Protocol & host OS support	<ul style="list-style-type: none"> <li>• The offered Storage shall be supplied with at least 2 x 10G IP Ports, 4 x 1GbE ports &amp; 4 x 16Gbps FC Ports across the 2 controllers for Host Connectivity.</li> <li>• The Storage System should support FC, NFS (pNFS), iSCSI, CIFS and FCoE protocols &amp; should be licensed from day one with NFS (pNFS), CIFS, iSCSI and FC protocols.</li> <li>• Should support Windows, Linux, UNIX, HP/UX, Solaris, AIX, VMWare ESX.</li> <li>• Should support SSD, SAS (10K RPM), NL-SAS within the storage.</li> </ul>
Storage Capacity Requirements with Disk Protection	<ul style="list-style-type: none"> <li>• The Proposed Storage Array should be configured with minimum 30TB Usable Capacity.</li> <li>• Drives should be configured in RAID 6 to ensure protection for double disk failure in any RAID group.</li> </ul>
Storage features	<ul style="list-style-type: none"> <li>• The storage system should support both block level and file level de-duplication. Software or hardware should be provided to achieve de-duplication for the entire array capacity.</li> <li>• The storage system should support compression. Software or hardware should be provided to achieve the same for the entire array capacity.</li> <li>• The storage system shall support quality of service by allocating system resource priority on the corresponding LUNs/Volumes. Software or hardware should be provided to achieve the same for the entire array capacity.</li> <li>• The storage system shall have the ability to expand LUNs/Volumes on the storage online and instantly without any service disruption.</li> <li>• The storage system shall support logical partitioning of controllers such that each partition appears as a separate virtual storage in itself. Software or hardware should be provided to achieve the same for the entire array capacity.</li> <li>• The storage system should support NDMP data backup.</li> <li>• The storage system should have redundant hot swappable components like disks, power supplies, fans etc.</li> </ul>
Storage Management Software	<ul style="list-style-type: none"> <li>• Easy to use GUI / web enabled administration interface for configuration, storage management.</li> </ul>
Point in time Snapshots	<ul style="list-style-type: none"> <li>• The storage system should be configured with the requisite licenses to create instant, online and consistent point-in-time Snapshot copies for block data as well as file data. The license proposed should be for the complete supported capacity of the system</li> </ul>

**99. ACCESS POINTS: Wireless N Adapter****SME 1248149**

	<b>Model</b>	
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....

Point-to-Multipoint Base Station Radio					
Sl. No.	Features	Description	Compliance	Make and Model	Remarks
1	Frequency	Radio should operate in 2.4Ghz or 5.8Ghz as per ISM Band of India WPC.			

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

3	Channel Bandwidth	System must support 5/10/20 MHz Channel Bandwidth			
4	Channel Spacing	In 5MHz channel steps or better preferably			
5	Max Output Power at Antenna port	Base Station: Max Tx Power is 25dBm and can be changed in steps of 1dBm			
		CPE: Max Tx Power is 21dBm and can be changed in steps of 1dBm			
6	Modulation	2x2 MIMO-OFDM (BPSK/QPSK/16QAM/64QAM) with Forward Correction (FEC)			
		Should support automatic adaptive modulation, separated per CPE per direction for maximum performance			
7	Architecture	60° / 90° Antenna			
10	CPE Isolation	System should have the capability to isolate one CPE from other CPE for better security			
12	Mac Address Learning Capability	System should support minimum 1000 MAC address learning to minimize broadcast in network			
13	Diagnostic	Bandwidth Test, Telnet, Antenna Alignment, Spectrum analyzer for 5 MHz, 10MHz and 20 MHz			
14	Error correction	3/4 Reed Solomon Forward Error Correction coding and ARQ			
15	Auto Firmware Upgradation	Scheduled upgrade can be done from Base Station			
16	Distance Coverage	Min 20-25 Km from Base Station			
17	Number of CPE per Base station	Device should have the support of 100 CPE with Data Encryption			
18	Vlan Support	VLAN support based on IEEE 802.1Q			
19	Security	128 bit AES authentication, FIPS 197 Certified			
21	Throughput	System must deliver actual/usable throughput of minimum 114.5 Mbps with 20 MHz Channel Width			
20	Encryption effect on throughput	Throughput capacity should not be reduced when using AES encryption			
22	Spectral Efficiency	System should have spectral efficiency of 5.63bits/Hz for 20 MHz, 5 bits/Hz for 10 MHz and 3.68 bits/Hz for 5 MHz Channel Bandwidth			

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

23	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Upload and download percentage should be user configurable in steps of 1 %			
24	MIMO-B	System must have the support for 2 x 2 MIMO-B technology to increase the throughput			
25	Avoid Collision	System should use all available mechanism to avoid collision			
26	Interference mitigation	System carry small Radio data packet to combat interference without impacting performance			
28	Management	System should have support of IPv4, IPv6 dual stack, UDP, TCP, IP, ICMP, Telnet, SNMPv1, v3, HTTP, FTP			
		System should have support of Network Management with, Telnet, SNMP			
29	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority,			
30	Ethernet Latency	Average latency of a heavily loaded (85% of link capacity) one way trip must not exceed 14 ms Max (regardless of packet size)			
31	Subcarrier	System should support minimum 256@20MHz, or better subcarrier to support superior performance in NLOS condition			
32	Surge Protection	System should have inbuilt surge protection mechanism to tolerate 1 Joule			
33	GPS synchronization	System should support GPS synchronization technique to eliminate UL and DL interference			
34	Collocation of Sectors	Co-located radios using adjacent channels on a common plane must not require a guard band for optimal performance			
35	Synchronization Redundancy	Should support external GPS and in case of external GPS system should support free run mode			
36	MTBF	More than 40 Years			
37	Operation Temp.	40°C to 55°C Outdoor			

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

38		20°C to 40°C Indoor			
	Protection	IP 66 or better			
39	WPC Approved	System must be approved from WPC			
40	Certification	EN 302 502 v1.2.1 (5.8 GHz)			
		FCC: 47 CFR Part 15			

**Sectoral Antenna 17 dBi -**

**SME 1248150**

Sl. No.	Features	Description	Compliance	Make and Model
1	Frequency	5.8 GHz		
2	Gain	16 dBi		
3	VSWR	1.7:1		
4	Wind Speed	Survival-190 KMs/h		
		Operation -160 KMs/h		
5	Protection	IP 66 or better		

**Remote Station Unit (CPE Unit) -**

**SME 1248151**

Sl. No.	Features	Description	Compliance	Make and Model
1	Frequency	Radio should operate in India ISM Band (5.8GHz) as per WPC Regulation		
2	Band Support	Radio Must support 5.8GHz Multi-Band		
3	NLOS,nLOS operation	Must support 256@20MHz, or better subcarrier to support superior performance in NLOS ,nLOS conditions		
4	Channel Bandwidth	5 / 10 / 20 MHz with 5MHz steps		
5	Max Output Power at Antenna port	Base station: Max Tx Power is 25dBm and can be changed in steps of 1dBm		
		CPE: Max Tx Power is 21dBm and can be changed in steps of 1dBm		
6	Modulation	2x2 MIMO-OFDM (BPSK/QPSK/16QAM/64QAM)with Forward Error Correction (FEC)		
		Should support automatic adaptive modulation, separated per CPE per direction for maximum performance		
7	Architecture	Integrated, minimum 15dBi, Must support H and V polarization patch		
		Single Cable between IDU & ODU		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

8	Distance Coverage	Minimum 20-25 Km from Base station		
9	External Gain	CPE must have option of ordering connectorized version for using external antenna for covering large range		
11	MIR/CIR	Should support the MIR configuration to ensure SLA		
13	Ethernet Latency	Average latency of a heavily loaded (85% of link capacity) one way trip must not exceed 14ms (regardless of packet size)		
16	Broadcast Rate Limit	System must be able to limit broadcast		
19	Management of Video Traffic	Please describe how your radio system is designed to accommodate traffic of burst nature, such as real time video surveillance traffic		
20	Link Test Utility	Should support the inbuilt link test utility to calculate the throughput and efficiency of link		
21	VLAN Support	VLAN support based on IEEE 802.1Q		
22	Security	128 bit AES authentication,		
23	Throughput	10 Mbps and software configurable more than 50 Mbps without changing the hardware		
24	Spectral Efficiency	Should be greater than 5 bps/Hz for access		
25	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Upload and download percentage should be user configurable		
26	MIMO-B	System must have the support for 2 x 2 MIMO-B technology to increase the throughput		
27	Avoid Collision	System should use any collision avoid system		
28	Interference mitigation	System carry small Radio data packet to combat interference without impacting performance		
29	LAN Interface	System must have 100Base(T) Half/Full Duplex, rate auto negotiated (802.3 compliant)		
30	Management	System should have support of IPv4/IPv6 (Dual stack), UDP, TCP, IP, ICMP, Telnet, SNMPv1, v3, HTTP, FTP		

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

		System should have support of Network Management with Telnet, SNMP		
31	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority,		
32	QoS	Must support 802.1P and Diffserve QoS		
33	Error Correction	3/4 Reed Solomon Forward Error Correction coding and ARQ		
34	Alignment	SNR bar or beeper based alignment option on outdoor radio unit for antenna alignment		
35	Antenna Gain	Should have provision to increase the gain of integrated antenna up to 12 dBi		
36	Antenna Beamwidth	Antenna Beam width must be 30° azimuth, 15° elevation (both H&V)		
37	Operation Temp.	40°C to 55°C Outdoor 20°C to 40°C Indoor		
38	Protection	IP55 or better		
39	WPC Approval	System must be approved from WPC		
40	Certification	EN 302 502 v1.2.1 (5.8 GHz)		
		FCC: 47 CFR Part 15		

**Point-to-Point Radio High Capacity –**

**SME 1248152**

Sr	Features	Description	Compliance	Make and Model
1	Frequency	Radio should operate in India ISM Band i.e. from 5825 to 5875 MHz as per WPC Regulation		
2	Band Support	Radio Must support 5.8GHz		
3	NLOS,nLOS operation	Radio Must support NLOS, nLOS condition		
4	Throughput	System should support 125 Mbps aggregate throughput		
5	Capacity Upgradation	System should have the option of capacity upgrade up to 400 mbps via license key without changing Hardware		
6	Channel Bandwidth	Radio must support Channel Bandwidth of– 5,10, 20, 40 MHz,		



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

7	Channel Spacing	System must support the channel step size of 5 MHz or better		
8	Channel Selection	Dynamic Spectrum optimization or manual intervention		
		Automatic selection on start-up		
9	Max Output Power at Antenna port	Up to 25 dbm, Varies with modulation mode and setting		
10	Modulation	Radio must have Fast predictive Adaptive modulation featuring 2x8 modulation/FEC coding levels ranging from BPSK to 64QAM dual payload MIMO		
11	Duplex Scheme	Radio should have the support for Synchronized Time Division Duplex (TDD) dynamic or fixed transmit/receive ratio		
12	Architecture	Single Cable between IDU & ODU distance not less than 90 Meters		
13	Sensitivity	-95 dBm		
14	Distance Coverage	Upto 62.13 Miles (100 KM)		
15	VLAN Support	VLAN support based on IEEE 802.1Q		
16	Frame Size	System should support the jumbo frame size of 1700Bytes		
17	QoS	802.1P and DSCP(TOs and DSCP both work on Layer 3 .TOs provides very limited option		
18	Queue support	It is mandatory for the system to support 4 QOS level		
20	Security	optional 128 bit AES authentication, FIPS 197 Certified		
21	Packets Per Second	450,000 PPS		
22	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Upload and download percentage should be user configurable.		

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

23	MIMO-B	System must have the support for 2 x 2 MIMO-B technology to increase the throughput		
24	LAN Interface	System must have 1000Base(T) half/full duplex, rate auto negotiated (802.3 compliant)		
25	IPv4/IPv6 support	System must support IPv4 and IPv6 support		
29	NLOS Performance	System must support 256@20MHz, subcarrier for superior performance in NLOS condition		
30	Management	System should have support of IPv4, UDP, TCP, IP, ICMP, Telnet, SNMPv1,v3, HTTP, FTP		
		System should have support of NETWORK MANAGEMENT with Telnet, , SNMP		
31	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority,		
32	ARQ	System should have the support of ARQ		
33	Ethernet Latency	Latency should be below 10ms with 90% Load condition		
34	Antenna Type	23 dBI Integrated Antenna		
35	GPS synchronization	System should support GPS synchronization technique to eliminate interference		
36	Operation Temp.	40°C to 60°C Outdoor		
		20°C to 40°C Indoor		
37	Wind survival	Minimum 220 km/h		
38	Protection	IP66 or better		
39	Certificates			
		FCC: Part 15, sub-parts 15C and 15E RSS 210 Issue 8		
		CE: EN 302 502; EN 301 893;		
		Safety: UL60950-1; IEC60950-1; EN60950-1; CSA-C22.2 No. 60950-1		
		EMC: EN 301 489-1 and EN 301 489-4		

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE

-A

**Point to Point up to 125 Mbps –**

**SME 1248153**

Sl. No.	Features	Description	Compliance	Make and Model
1	Frequency	Radio should operate in India ISM Band (5.8GHz) as per WPC Regulation		
2	Band Support	Radio Must support 5.8GHz Multi-Band		
3	NLOS,nLOS operation	Must support 256@20MHz subcarrier to support superior performance in NLOS ,nLOS conditions		
4	Channel Bandwidth	5 / 10 / 20 MHz with 3 MHz steps or better		
5	Max Output Power at Antenna port	-8 to 25dBm, 1dB step		
6	Modulation	QPSK, 16-QAM, 64-QAM, 256-QAM, MIMO-B, with Forward Error Correction (FEC)		
		Should support automatic adaptive modulation		
7	Architecture	Integrated, minimum 9 dBi, Must support H and V polarization patch		
		Single Cable between IDU & ODU		
8	Distance Coverage	Minimum 20-25 KMs		
9	External Gain	System must have provision of increasing the antenna gain without RF cable to avoid moisture or point of failure, to cover longer distance		
10	Transmit Power	Manual Transmit Power Control in steps of 1dBm		
11	Ethernet Latency	Average latency of a heavily loaded (85% of link capacity) one way trip must not exceed 14 ms (regardless of packet size)		
13	Link Test Utility	Should support the inbuilt link test utility to calculate the throughput and efficiency of link		
14	VLAN Support	VLAN support based on IEEE 802.1Q		
15	Security	, FIPS-197 128-bit AES authentication		
16	Throughput	System must support provide at least 100 Mbps usable throughput		
17	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth.		
18	MIMO-B	System must have the support for 2 x 2 MIMO-B technology to increase the throughput		

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

19	LAN Interface	System must have 10/100Base(T) Half/Full Duplex, rate auto negotiated (802.3 compliant)		
20	Management	System should have support of IPv4, UDP, TCP, IP, ICMP, Telnet, SNMP, HTTP, FTP		
		System should have support of Network Management with Telnet, SNMP		
21	Management VLAN	System should have the support of VLAN 802.1ad (DVLAN Q-in-Q), 802.1Q with 802.1p priority		
22	QoS	Must support 802.1P and Diffserve QoS		
23	Error Correction	3/4 Reed Solomon Forward Error Correction coding and ARQ		
24	GPS synchronization	System should support GPS synchronization technique to eliminate interference		
25	Alignment	SNR bar or beeper based alignment option on outdoor radio unit for antenna alignment		
26	Antenna Gain	Should have provision to increase the gain of integrated antenna up to 17 dBi		
27	Operation Temp.	40°C to 55°C Outdoor		
		20°C to 40°C Indoor		
28	Protection	IP55 or better		
29	WPC Approval	System must be approved from WPC		
30	Certification	EN 302 502 v1.2.1 (5.8 GHz)		
		FCC: 47 CFR Part 15		

**Point to Point – Up to 200 Mbps – Low Distance up to 20 KM –**

**SME 1248154**

Sl. No.	Features	Description	Compliance	Make and Model
1	Frequency	Same Radio should operate in India ISM Band (5.8GHz) as per WPC Regulation		
2	Topology	separate Hardware for Point to Point and Point to Multi Point Radios		
3	Channel Bandwidth	System must support 5MHz / 10 MHz / 20MHz / 40 MHz Channel Bandwidth		
4	Channel Spacing	Configurable on 5MHz increments		
5	Max Output Power at Antenna port	-8 to 25dBm, 1dB step		

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

6	Modulation	QPSK, 16-QAM, 64-QAM, MIMO, OFDM with Forward Error Correction (FEC)		
		Should support automatic adaptive modulation		
7	Architecture	25 dBi Dish Antenna		
		Single Cable between IDU & ODU		
9	Distance Coverage	shall support at least for 20 KMs		
10	Vlan Support	VLAN support based on IEEE 802.1Q with 802.1p priority		
11	Encryption	128 bit AES		
12	Throughput	System must deliver actual/usable aggregate throughput of at least 100 Mbps in 20 MHz Channel Width		
13	Encryption effect on throughput	Throughput capacity should not be reduced when using AES encryption		
14	LAN Interface	System must support 10/100/1000Base(T) half/full duplex, rate auto negotiated		
15	Management	System should have support of IPv4, UDP, TCP, IP, ICMP, Telnet, SNMP, HTTP, FTP		
		System should have support of Network Management with Telnet, SNMP		
16	Quality of Service	Must support 802.1P and Diffserve QoS and 4 levels of Queues		
17	ARQ	System should support ARQ		
18	Ethernet Latency	Typical latency shall not exceed 10ms roundtrip		
19	Surge Protection	System should have inbuilt surge protection mechanism		
20	GPS synchronization	System should support GPS synchronization technique to eliminate UL and DL interference		
21	Colocation of Sectors	Co-located radios using adjacent channels on a common plane must not require a guard band for optimal performance		
22	Power Consumption	Less than 20W		
23	Priority Management	User must be able to define priority for management and data traffic		
24	Prioritization of Multicast	System must support prioritization of Multicast for Video Streaming.		

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

25	Classification	Packet Classification priority queues according to 802.1p/Diffserve		
26	MAC (Media Access Control) Layer	System should support CSMA - CA Technology		
28	Packets Per Second	Minimum 20000 PPS		
29	Spectral Efficiency	Minimum 5 bps/Hz or better		
30	Bandwidth	System should be able to configure symmetric & asymmetric bandwidth. Also should support flexible dynamic Upload and download percentage should be user configurable.		
37	Tools	System must supports inbuilt tool to Estimate Throughput Testing, Spectrum View		
38	NTP	System must be able to derive clock from NTP Server – optional		
40	Spectrum Analyzer	System must support Spectrum analyzer tool to find the best available frequency to be used.		
41	Performance Statistic	System must be able to provide detail statistic of Wireless and LAN Interface including Received packets, error ,PM logs, diagnostic, active alarms, event logs		
43	Operation Temp.	30°C to 55°C Outdoor		
		20°C to 40°C Indoor		
44	Protection	Shall support IP55 or better		
45	WPC Approved	System must be approved from WPC		
46	Certification	EN 302 502 v1.2.1 (5.8 GHz)		
		FCC: 47 CFR Part 15		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**100. Out Door- Aggregation switch : Layer3 Switch: 24 100/1000 Base-X Ports and 4 1G/10G SFP+ slots  
SME 1248155**

Sl. No.	Detail	Requirements
	Make	Pl specify
	Model	Pl specify
	Manufacturer's Authorization	Attachment file name.....
	Technical Literature/Brochure	Attachment file name.....
1	L2/3 Features	<p>L3 Stackable Managed Switch</p> <p>Should support static routing and VRRP from day one and shall be upgradable to support RIP, RIPng, OSPFv2/v3, PIMv4, PIMv6 without changing base hardware</p> <p>The proposed Virtual chassis or Equivalent technology should support high availability for both Layer 2 and Layer 3 Including for IP Multicasting optimised for Real time applications like Voice and Video IP traffic</p> <p>The Min Virtual chassis bandwidth between the switches shall be min of 20Gbps and should support the redundancy across the geographically diversified locations</p> <p>The Switch should be able to do Physical Stack up to 4units per stack or more</p> <p>The Switch should be able to do IP Stacking up to 4 units per IP</p> <p>The Switch should have IGMP Snooping v1,v2,v3 &amp; MLD Snooping v1,v2</p> <p>The Switch should have Spanning tree 802.1d,802.1w,802.1s, sub 50ms ring protection as per IEEE 802.17 or equivalent</p> <p>The proposed Ring protection technology shall be capable of handling data loop whose path traverse more than a single ring and the loop occurs when there is a break in a physical segment that is shared by two rings</p> <p>The Switch should have 802.3ad Link Aggregation</p> <p>The Switch should have Port Mirroring One to one/Many to One</p> <p>IGMP/MLD multicast forwarding (IGMP/MLD proxy) , IGMP Snooping Fast - leave , IGMP Filtering , IGMP snooping mrouter ports, IGMP snooping report suppression , IGMP source address check , IGMP static entries</p> <p>IGMP Querier and IGMP Snooping Querier</p> <p>The Switch should have the capability to build the trunk across stack</p> <p>The Switch should support</p> <p>It should support LLDP</p> <p>Switch should have option to equip internal RPS for higher availability</p> <p>It should support IPv6 Neighbour Discovery</p>

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

2	MAC Address	16K 256 Static MAC Address
5	Flash Memory:	64 MB
6	SD RAM	256 MB
7	Packet Buffer	1 MB for Non-blocking architecture
8	Jumbo Frame	Up to 9K
9	VLAN	The LAN switch should have IEEE 802.1Q VLAN encapsulation. Up to 4000 active VLANs per switch and up to 4000 VLAN IDs. VLAN creation based on protocol ,Port and Subnet based Equal Cost Multi Path (ECMP) routing It shall support 802.1v &Q-in-Q VLAN, Guest VLAN
10	QoS	It should support 802.1p Priority Queues (8 Queues) Queue Handling mode: WRR & Strict Mode Granular Rate Limiting functions on per port & flow based to guarantee bandwidth in increments should be as low as 64 Kb per Second. Class of service should be based on Switch port, DSCP, Vlan ID,TCP/UDP port, Protocol type,802.1p queues, IPv4/v6 address,
11	ACL	The LAN Switch should have the capability to support access list based on IPv4/ address, Protocol type,, Time based ACL,
12	Security	The LAN switch should support IEEE 802.1x to allow dynamic, port-based, Host based security, providing user authentication Network Access and Control (NAC) features manage end point security  It should support for SSHv2, SNMPv3; SNMP over IPv6 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions. Switch should support ; RADIUS authentication ; TACACS; TACACS+  It should support DHCP snooping and to allow administrators to ensure consistent mapping of IP to MAC addresses. It should support DHCP relay option 82 DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI) Private VLANs provide security and port isolation It should have Web & MAC Based Access Control It should have CPU Filtering to protect the CPU from Broadcast / Multicast / Unicast flooding & protocol control packets attacks



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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

13	Management	<ul style="list-style-type: none"> <li>· The LAN switch should have CLI</li> </ul>
		DDM – Optical digital diagnostic monitoring as per SFF – 8472 or equivalent standards
		<ul style="list-style-type: none"> <li>· It should have RMON software agent to support four RMON groups for enhanced traffic management, monitoring and analysis</li> </ul>
		<ul style="list-style-type: none"> <li>· It should support TFTP to reduce the cost of administering software upgrades by downloading from a centralized location.</li> </ul>
14	Certification	<ul style="list-style-type: none"> <li>· It should support Network Timing Protocol (NTP/SNTP) to provide an accurate and consistent timestamp to all intranet switches.</li> </ul>
		<ul style="list-style-type: none"> <li>· It should support SNMPv1, v2c, v3 and Telnet interface to deliver comprehensive in-band management, and a CLI-based management console</li> </ul>
		<ul style="list-style-type: none"> <li>· It should provide management functions for network segments (access links and individual circuits), monitors individual links.</li> </ul>
	Environmental	View-based Access Control Model (VACM) for SNMP, User-based Security Model (USM) for SNMPv3
		An USB or equivalent memory card socket , allowing software release files, configuration and other files to be stored for backup and distribution to other switches
14		EMI/EMC -- FCC Class A, ICES-003 Class A, VCCI Class A., IEC 61000-4-5 Class 3 or ANSI/TIA-968-A, UL/CSA 60950-1; IEC60950-1
		Switch should inherently support continuous operating temperature range of 0-65C or more
15	Warranty	3 years onsite comprehensive warranty

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

**RATE PROFORMA (FORM NO. 1)**

Quoted rates should be inclusive of Excise duty (net rate of excise duty after passing on the MODVAT benefit) LUN's service charges @ 2%, inspection charges @ 0.5% and applicable Service Tax, but exclusive of sales/VAT/commercial tax and other levies which should be shown separately. Please give breakup of the rates in separate sheet. For details, refer condition no. 10 of tender document.

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
1	SME 124801	IP Camera Enclosure- Pendant mount for outdoor camera		
2	SME 124802	IP Power Box Enclosure - Outdoor Power Box		
3	SME 124803	IP Camera Lens- CS Mount Megapixel Vari-Focal A/I Lens		
4	SME 124804	IP Camera Enclosure- IP66 Certified Enclosure for Box camera		
5	SME 124805	Network Based IP Camera- 2 Megapixel Full HD Dome Camera		
6	SME 124806	Network Based IP Camera- Full HD 2 Mpxl day / Night IR Bullet Camera		
7	SME 124807	Network Based IP Camera- 30x Full HD Outdoor Speed Dome PTZ Camera		
8	SME 124808	Network Based IP Camera- 2 Mega Pixel Network Box Camera		
9	SME124809	Network Based IP Camera- Outdoor Network Dome Camera		
10	SME 124810	Network Based IP Camera- 5Mpxl Fisheye Network Camera		
11	SME 124811	Network Based IP Camera - Outdoor Network IR Bullet Camera		
12	SME 124812	Network Based IP Camera- Under Vehicle Surveillance System with Integrated ANPR		
13	SME 124813	Network Video Recorder, Monitoring Software & Storage - 32 Channel Network Video Recorder with 24TB HDD		
14	SME 124814	Video Management Software		
15	SME 124815	Storage System with 16 TB HDD		
16	SME 124816	Storage System with 64 TB HDD		
17	SME 124817	Video Management & Analytics Software- Enterprise version		
18	SME 124818	Media Convertor: 10/100 Single Mode Media Convertor		
19	SME 124819	Media Convertor: 10/100/1000 Single Mode Media Convertor		
20	SME 124820	STRUCTURED CABLING: Cat 6 UTP, 4 Pair Network Cable		
21	SME 124821	STRUCTURED CABLING: Cat 6 UTP, Face Plate		
22	SME 124822	STRUCTURED CABLING: Cat 6 UTP, Information Outlet		
23	SME 124823	STRUCTURED CABLING: Cat 6 UTP, 24 Port Jack		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

		Panel Loaded		
24	SME 124824	STRUCTURED CABLING: Cat 6 UTP, Patch Cords		
Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
25	SME 124825	Fiber Cabling Components: OFC Single Mode 24 Core Fiber		
26	SME 124826	Fiber Cabling Components: Single Mode Fiber Patch Panels Rack Mount (LIU)		
27	SME 124827	Fiber Cabling Components: Single Mode Adapters		
28	SME 124828	Fiber Cabling Components: Single Mode Connectors		
29	SME 124829	Fiber Cabling Components: Single Mode Fiber Patch Cords/Pigtails		
30	SME 124830	Network Switches: 24 port • 24 x 10/100 Ports + 2 Combo 10/100/1000 Base-T/SFP Ports/12 Gbps Switching Capacity/512KB Packet Buffer		
31	SME 124831	Network Switches: 48 port • 48 x 10/100 Ports + 2 Combo 10/100/1000 Base-T/SFP Ports/17Gbps Switching Capacity/1 Mb Packet Buffer		
32	SME 124832	Network Switches: 24 Port Layer 2 10/100 Switch		
33	SME 124833	Network Switches: 24 Port • 24 x 10/100Mbps + 2 100/1000 SFP + 2 Combo 10/100/1000BASE-T/SFP, 12 Gbps Switching Capacity/9 Mpps Forwarding capacity/384 Kb Packet Buffer		
34	SME 124834	Network Switches: 48 Port • 48 x 10/100Mbps + 2 100/1000 SFP + 2 Combo 10/100/1000BASE-T/SFP, 17 Gbps Switching Capacity/13 Mpps Forwarding capacity/1.5 MB Packet Buffer		
35	SME 124835	Network Switches: 8 x 10/100/1000 PoE Switch and 4 1G Base-X ports with 1.6Gbps Switching Capacity/1Mpps Forwarding capacity/384 Kb Packet Buffer or higher		
36	SME 124836	Network Switches: 24 port • 24 x 10/100PoESwitch with 12 Gbps Switching Capacity/9 Mpps Forwarding capacity/512 Kb Packet Buffer higher		
37	SME 124837	Network Management System: License for 25 Nodes		
38	SME 124838	Network Management System: License for 50 Nodes		
39	SME 124839	Network Management System: License for 100 Nodes		
40	SME 124840	Network Management System: License for 250 Nodes		
41	SME 124841	Network Management System: License for 500 Nodes		
42	SME 124842	Network Management System: License for 1000 Nodes		
43	SME 124843	Network Management System: License for 5 Probes		
44	SME 124844	Network Management System: License for 10 Probes		
45	SME 124845	Network Management System: License for 25 Probes		
46	SME 124846	Network Management System: License for 50 Probes		
47	SME 124847	Network Management System: License for 100 Probes		
48	SME 124848	Core Switches: 4 Slot Chassis Switch with single CPU engine		
49	SME 124849	Core Switches: 12 Slot Chassis Switch with Dual CPU engine		
50	SME 124850	Transceivers: 1G Transceivers for Single Mode Fiber		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
51	SME 124851	<b>Transceivers:</b> 10G Transceivers for Single Mode Fiber		
52	SME 124852	CPU Engine for Chassis		
53	SME 124853	Power Module for Chassis		
54	SME 124854	<b>Line Cards compatible with above Chassis:</b> 24 ports 10/100/1000Base-T Module		
55	SME 124855	<b>Line Cards compatible with above Chassis:</b> 24 ports 10/100/1000Base-T PoE Module		
56	SME 124856	<b>Line Cards compatible with above Chassis:</b> 48 ports SFP Module		
57	SME 124857	<b>Line Cards compatible with above Chassis:</b> 24 ports 10/100/1000Base-T and 24 ports SFP Module		
58	SME 124858	<b>Line Cards compatible with above Chassis:</b> 6 ports 10G XFP Module		
59	SME 124859	<b>Line Cards compatible with above Chassis:</b> 16 10GE SFP+ Module		
60	SME 124860	<b>Expansion Modules for 8 Port &amp; 24 Port 10G Layer 3 Switch:</b> 8 x 1000BASE-T expansion module		
61	SME 124861	<b>Expansion Modules for 8 Port &amp; 24 Port 10G Layer 3 Switch:</b> 8 x 10G SFP+ expansion module		
62	SME 124862	<b>Redundant Power Supplies for Switches:</b> 60W Single Redundant Power Supply		
63	SME 124863	<b>Redundant Power Supplies for Switches:</b> 140W Single Redundant Power Supply		
64	SME 124864	<b>Redundant Power Supplies for Switches:</b> 1200W Single Redundant Power Supply		
65	SME 124865	<b>Redundant Power Supplies for Switches:</b> 589Watt Redundant Power Supply system		
66	SME 124866	<b>Network Router:</b> Fixed Router		
67	SME 124867	<b>Modular Multi-Service Integrated Router:</b> Physical Interface – 2 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 Interface slots		
68	SME 124868	<b>Modular Multi-Service Integrated Router:</b> Physical Interface – 2 * 10/100/1000 Mbps Gigabit Ethernet port, 16 * 10/100/1000 Mbps Ethernet port, 1 USB Interface, 1 console port, 1 AUX port, 4 HIC slots		
69	SME 124869	<b>Modular Multi-Service Integrated Router:</b> Physical Interface -- 2 * 10/100/1000 Mbps Gigabit Ethernet port, 1 USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 2 interface slots		
70	SME 124870	<b>Modular Multi-Service Integrated Router:</b> Physical Interface -- 4 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 6 interface slots		
71	SME 124871	<b>Modular Multi-Service Integrated Router:</b> Physical Interface -- 4 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 8 interface slots		

**MADHYA PRADESH LAGHU UDYOG NIGAM LTD.**

**(M.P. Government Undertaking)**

**Marketing Department**

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**Ph.: 0755-2673133,2673130, Fax: 0755-2673140**

Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
72	SME 124872	<b>Modules for above Routers:</b> Single-path gigabit-Ethernet card		
73	SME 124873	<b>Modules for above Routers:</b> One port 10/100/1000M Base-T SFP card		
74	SME 124874	<b>Modules for above Routers:</b> Single-path E1 card		
75	SME 124875	<b>Modules for above Routers:</b> Dual-path E1 card		
76	SME 124876	<b>Modules for above Routers:</b> Single-path serial card		
77	SME 124877	<b>Modules for above Routers:</b> Dual-path serial card		
78	SME 124878	<b>Modules for above Routers:</b> One port ISDN BRI card		
79	SME 124879	<b>Modules for above Routers:</b> 8-path asynchronous serial card		
80	SME 124880	<b>Modules for above Routers:</b> 16-path FE switching module		
81	SME 124881	<b>Modules for above Routers:</b> 4-path channelized E1 module		
82	SME 124882	<b>Modules for above Routers:</b> 8-path channelized E1 module		
83	SME 124883	<b>Modules for above Routers:</b> 4-path E1 module		
84	SME 124884	<b>Redundant Power Supplies for above Routers</b>		
85	SME 124885	<b>Wireless:</b> Wireless N 150 Router		
86	SME 124886	<b>Wireless:</b> Wireless N 150 Cloud Router		
87	SME 124887	<b>Wireless:</b> Wireless AC 750 Cloud Router		
88	SME 124888	<b>ADSL:</b> ADSL2+ 1 Port Ethernet/USB Combo Router		
89	SME 124889	<b>Wireless ADSL:</b> Wireless N150 ADSL2+ 4 Port Ethernet Router		
90	SME 124890	<b>Wireless:</b> Wireless N300 ADSL2+ 4-Port Ethernet Router with USB		
91	SME 124891	<b>Wireless PCI:</b> Wireless N150 Desktop PCI Adapter		
92	SME 124892	<b>Wireless USB:</b> Wireless N150 Pico USB Adapter		
93	SME 124893	<b>Wireless USB :</b> Wireless N150 USB Adapter		
94	SME 124894	<b>Outdoor Industrial Grade Switch:</b> as per specs		
95	SME 124895	<b>10G Distribution Switch:</b> 8 SFP+ ports with one expansion module with 480 Gbps Switching capacity & 357 Mpps forwarding rate		
96	SME 124896	<b>10G Distribution Switch:</b> 24 SFP+ ports with one expansion module with 960 Gbps Switching capacity & 710 Mpps forwarding rate		
97	SME 124897	<b>Accessories for 10G Switches:</b> Fan tray with front to back air-flow		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
98	SME 124898	Accessories for 10G Switches: AC power supply as required in above switch with front-to-back airflow		
99	SME 124899	Accessories for 10G Switches: Stacking Module		
100	SME 1248100	Accessories for 10G Switches: 4 x 40Gbps QSFP+ module		
101	SME 1248101	Accessories for 10G Switches: 4 x 10GBASE-T module		
102	SME 1248102	Accessories for 10G Switches: 8 x 10G SFP+ module		
103	SME 1248103	Video Management and Analytics Software–Basic Version: License Per camera		
104	SME 1248104	Video Management and Analytics Software– Enterprise Version: VMS- Base License		
105	SME 1248105	Video Management and Analytics Software– Enterprise Version: VMS Live View Only		
106	SME 1248106	Video Management and Analytics Software– Enterprise Version: VMS Live View + Recording + Redundancy		
107	SME 1248107	Video Management and Analytics Software– Enterprise Version: VMS Additional User License		
108	SME 1248108	Video Management and Analytics Software– Enterprise Version: VMS Multi Monitor Wall		
109	SME 1248109	Video Management and Analytics Software– Enterprise Version: VMS Failover License per camera		
110	SME 1248110	Video Management and Analytics Software– Enterprise Version: AMC (Annual Maintenance Charges)		
111	SME 1248111	Video Management and Analytics Software– Enterprise Version: Video Tamper & Video Motion per camera with Search Capability		
112	SME 1248112	Video Management and Analytics Software– Enterprise Version: Perimeter Intrusion with Search Capability		
113	SME 1248113	Video Management and Analytics Software– Enterprise Version: Loitering with Search Capability		
114	SME 1248114	Video Management and Analytics Software– Enterprise Version: Left Object with Search Capability		
115	SME 1248115	Video Management and Analytics Software– Enterprise Version Traffic Analytics @ Violation with Search Capability		
116	SME 1248116	Video Management and Analytics Software– Enterprise Version: Enterprise License ( All Rules) with search capability		
117	SME 1248117	Video Management and Analytics Software– Enterprise Version: Search Capability		
118	SME 1248118	ANPR System per Location		
119	SME 1248119	Face Recognition System per location		
120	SME 1248120	Tower With Lightning Arrester Per Meter (6 meter Basic Height)		
121	SME 1248121	Pole With Surge Protector Per Meter (6 meter Basic Height)		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
122	SME 1248122	USB Joystick with Hall Effect designed to provide network video controlling with responsive and accurate PTZ camera control and should be integrated with above used camera's & surveillance software		
123	SME 1248123	Desktop Geographic Information System (GIS)		
124	SME 1248124	Modules for Desktop Geographic Information System (GIS): Training and Operation Tool-kit		
125	SME 1248125	Modules for Desktop Geographic Information System (GIS): Geospatial analysis Tool-kit		
126	SME 1248126	Modules for Desktop Geographic Information System (GIS): Geospatial database creation		
127	SME 1248127	Server Geographic Information System (GIS)		
128	SME 1248128	Modules for Server Geographic Information System (GIS): Training and Operation Tool-kit		
129	SME 1248129	Modules for Server Geographic Information System (GIS): Geospatial analysis Tool-kit		
130	SME 1248130	Modules for Server Geographic Information System (GIS): Geospatial database creation		
131	SME 1248131	Modules for customization of Desktop/ Server Geographic Information System (GIS): GIS Software Development Toolkit		
132	SME 1248132	Geographic Information System (GIS) based Operational briefing and Training system		
133	SME 1248133	Front projection based 2 channel seamless Video wall System: Entry level configuration		
134	SME 1248134	Rear projection based 3 channel seamless Video wall System: Mid end configuration		
135	SME 1248135	Rear projection based 6 channel seamless Video wall System: High end configuration		
136	SME 1248136	LED panel based Integrated Data Wall System: Entry Level configuration		
137	SME 1248137	LED panel based Integrated Data Wall System: Mid Level configuration		
138	SME 1248138	LED panel based Integrated Data Wall System: High end configuration		
139	SME 1248139	Video Wall Processor (VWP): For small conference rooms, meeting rooms		
140	SME 1248140	Video Wall Processor (VWP): For mid size NOC, collaboration rooms		
141	SME 1248141	Video Wall Processor (VWP): For mid size control rooms		
142	SME 1248142	Video Wall Processor (VWP): For large size control rooms, NOC		

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.) (As per clause No. 10 of tender document)	Quoted Make & Model
143	SME 1248143	Modules for customization of Video Wall Processor (VWP): Input port expansion module		
144	SME 1248144	Modules for customization of Video Wall Processor (VWP): Tethered large screen multi-touch Controller		
145	SME 1248145	Network Video Recorder, Monitoring Software & Storage - 16 Channel Network Video Recorder with 24TB HDD		
146	SME 1248146	Network Video Recorder, Monitoring Software & Storage - 8 Channel Network Video Recorder with 16TB HDD		
147	SME 1248147	Network Video Recorder, Monitoring Software & Storage - 4 Channel Network Video Recorder with 16TB HDD		
148	SME 1248148	Unified Scale out Storage (30TB useable on RAID 6)		
	Add on Module for Storage			
149	SME 1248149	Dual port 10G NIC		
150	SME 1248150	Dual Port FC NIC		
151	SME 1248151	Dual Port 1G NIC		
152	SME 1248152	Replication License per TB		
153	SME 1248153	FC-IP card for replication		
154	SME 1248154	Flash/SSD 200GB		
155	SME 1248155	Flash/SSD 400GB		
156	SME 1248156	Flash/SSD 800GB		
157	SME 1248157	SAS Disk Drive 600 GB 10 K RPM Dual Ported		
158	SME 1248158	SAS Disk Drive 900GB 10 K RPM Dual Ported		
159	SME 1248159	SAS Disk Drive 1.2 TB 10 K RPM Dual Ported		
160	SME 1248160	SATA II / NL-SAS Disk Drive 2 TB 7.2 K RPM Dual Ported		
161	SME 1248161	SATA II / NL-SAS Disk Drive 3 TB 7.2 K RPM Dual Ported		
162	SME 1248162	SATA II / NL-SAS Disk Drive 4 TB 7.2 K RPM Dual Ported		
163	SME 1248163	SATA II / NL-SAS Disk Drive 6 TB 7.2 K RPM Dual Ported		
164	SME 1248164	48 Ports SAN/LAN Switch with active 24 ports 8 Gbps FC		
165	SME 1248165	24 Ports SAN Switch with active 12 ports 8 Gbps FC		
166	SME 1248166	Additional 12 Ports upgrade in SAN Switch		
167	SME 1248167	Point-to-Multipoint Base Station Radio		
168	SME 1248168	Sectoral Antenna 17 dBi		
169	SME 1248169	Remote Station Unit (CPE Unit)		
170	SME 1248170	Point-to-Point Radio High Capacity		
171	SME 1248171	Point to Point up to 125 Mbps		
172	SME 1248172	Point to Point – Up to 200 Mbps – Low Distance up to 20 KM		



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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

Sr. No	Sub- Item Code	Detail	FOR RATE (Rs.)	Quoted Make & Model
			(As per clause No. 10 of tender document)	
173	SME 1248173	Out Door- Aggregation switch : Layer3 Switch: 24 100/1000 Base-X Ports and 4 1G/10G SFP+ slots		
174	SME 1248174	Post warrantee onsite comprehensive Annual maintenance charges in %age of the cost of the product.		

**Note:**

1. The Bidder shall attach a copy of above rate Performa duly filled in with the details of quoted items and its Make/Model, without mentioning the Price. There must be clear mention of "Quoted" or "Not Quoted" in the column of Price, against each item. Instead of mentioning the price, else the item(s) without any mention shall be treated as not quoted and rates for such items shall not be opened.
2. This format of price schedule is a sample for the Bidder's. The bidder's are instructed to fill the rates in prescribed price schedule available on Portal. Price schedule should not be submitted in Technical Bid, other wise tender shall be rejected.

Place:

Date:

Signature of Authorized Signatory .....

Name .....

Designation .....

seal .....

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

Annexure - A

**(G)**

(To be submitted in the Technical Bid)

**DETAILS OF SERVICE CENTRE / DEALERS IN M.P.**  
**(After Sale Service Support)**

Sl. No.	Name, Address & Telephone Nos. Of Service Centres	Quantity of spares Inventory (Value)	Details of Technical Personnel	Jurisdiction of the Service Centre
(1)	(2)	(3)	(4)	(5)

Name & designation of the authorized signatory

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

CERTIFICATION SHEET (H)

ANNEXURE-B

S No	Sub item Code	Detail	Certification (Additional Certificates, if any)										
1	SME 124801	IP Camera Enclosure- Pendant mount for outdoor camera											
		Submitted Yes/No (Hard copy Pg No.)											
2	SME 124802	IP Camera Enclosure - Outdoor Power Box	CE										
		Submitted Yes/No (Hard copy Pg No.)											
3	SME 124803	IP Camera Lens – CS Mount Megapixel Vari-Focal A/I Lens											
		Submitted Yes/No (Hard copy Pg No.)											
4	SME 124804	IP Camera Enclosure- IP66 Certified Enclosure for Box camera											
		Submitted Yes/No (Hard copy Pg No.)											
5	SME 124805	Network Based IP Camera- 2 Megapixel full HD IR Dome camera	UL	CE	FCC								
		Submitted Yes/No (Hard copy Pg No.)											
6	SME 124806	Network Based IP Camera- Full HD 2 Mpxl Day/Night IR Bullet Camera	UL	CE		FCC							
		Submitted Yes/No (Hard copy Pg No.)											
7	SME 124807	Network Based IP Camera- 30x Full HD Outdoor Speed Dome PTZ Camera	UL	CE		FCC							
		Submitted Yes/No (Hard copy Pg No.)											

SpecCCTV(Outdoor)e-T2015

Seal and Signature of Tenderer

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

S No	Sub item Code	Detail	Certification									
8	SME 124808	Network Based IP Camera- 2 Mega Pixel Network Box Camera	UL	CE			FCC					
		Submitted Yes/No (Hard copy Pg No.)										
9	SME 124809	Network Based IP Camera- Outdoor Network Dome Camera	UL	CE			FCC					
		Submitted Yes/No (Hard copy Pg No.)										
10	SME 124810	Network Based IP Camera- 5Mpxl Fisheye Network Camera	CE	UL			FCC					
		Submitted Yes/No (Hard copy Pg No.)										
11	SME 124811	Network Based IP Camera-11. Outdoor Network IR Bullet Camera	UL	CE			FCC					
		Submitted Yes/No (Hard copy Pg No.)										
12	SME 124812	Network Based IP Camera- Under Vehicle Surveillance System with Integrated ANPR		CE			FCC					
		Submitted Yes/No (Hard copy Pg No.)										
13	SME 124813	Network Video Recorder, Monitoring Software & Storage – 32 Ch Network Video Recorder with 24 TB HDD										
		Submitted Yes/No (Hard copy Pg No.)										
14	SME 124814	Network Video Recorder, Monitoring Software & Storage – Video Management Software										
		Submitted Yes/No (Hard copy Pg No.)										
15	SME 124815	Network Video Recorder, Monitoring Software & Storage – Storage System with 16TB HDD	UL									
		Submitted Yes/No (Hard copy Pg No.)										

SpecCCTV(Outdoor)e-T2015

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE -A

S No	Sub item Code	Detail	Certification										
16	SME 124816	Network Video Recorder, Monitoring Software & Storage – Storage System with 64TB HDD	UL										
		Submitted Yes/No (Hard copy Pg No.)											
17	SME 124817	Video Management and Analytics Software– Video Management & Analytics software - Enterprise Version											
		Submitted Yes/No (Hard copy Pg No.)											
18	SME 124818	Media Convertor: 10/100 Single Mode Media Convertor	UL	FCC									
		Submitted Yes/No (Hard copy Pg No.)											
19	SME 124819	Media Convertor: 10/100/1000 Single Mode Media Convertor	UL	FCC									
		Submitted Yes/No (Hard copy Pg No.)											
20	SME 124820	STRUCTURED CABLING: Cat 6 UTP, 4 Pair Network Cable											
		Submitted Yes/No (Hard copy Pg No.)											
21	SME 124821	STRUCTURED CABLING: Cat 6 UTP, Face Plate											
		Submitted Yes/No (Hard copy Pg No.)											
22	SME 124822	STRUCTURED CABLING: Cat 6 UTP, Information Outlet											
		Submitted Yes/No (Hard copy Pg No.)											
23	SME 124823	STRUCTURED CABLING: Cat 6 UTP, 24 Port Jack Panel Loaded											
		Submitted Yes/No (Hard copy Pg No.)											

SpecCCTV(Outdoor)e-T2015

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ITEM Code: SME 1248

Tender No.: KE -A

S No	Sub item Code	Detail	Certification										
24	SME 124824	STRUCTURED CABLING: Cat 6 UTP, Patch Cords											
		Submitted Yes/No (Hard copy Pg No.)											
25	SME 124825	Fiber Cabling Components:OFC Single Mode Fiber											
		Submitted Yes/No (Hard copy Pg No.)											
26	SME 124826	Fiber Cabling Components: Single Mode Fiber Patch Panels Rack Mount (LIU)											
		Submitted Yes/No (Hard copy Pg No.)											
27	SME 124827	Fiber Cabling Components: Single Mode Adapters											
		Submitted Yes/No (Hard copy Pg No.)											
28	SME 124828	Fiber Cabling Components: Single Mode Connectors											
		Submitted Yes/No (Hard copy Pg No.)											
29	SME 124829	Fiber Cabling Components:Single Mode Fiber Patch Cords/Pigtails											
		Submitted Yes/No (Hard copy Pg No.)											
30	SME 124830	Network Switches: 24 port • 24 x 10/100 Ports + 2 x 10/100/1000 Base-T + 2 Combo 10/100/1000 Base-T/SFP Ports/12 Gbps Switching Capacity/512 KB Packet Buffer	UL	CE				FCC					
		Submitted Yes/No (Hard copy Pg No.)											
31	SME 124831	Network Switches: 48 port • 48 x 10/100 Ports + 2 x 10/100/1000 Base-T + 2 Combo 10/100/1000 Base-T/SFP Ports /17 Gbps Switching Capacity/1 Mb Packet Buffer	UL	CE				FCC					
		Submitted Yes/No (Hard copy Pg No.)											

SpecCCTV(Outdoor)e-T2015

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ITEM Code: SME 1248

Tender No.: KE

-A

S No	Sub item Code	Detail	Certification									
32	SME 124832	Network Switches: 24 Port Layer 2 10/100 Switch	UL	CE	FCC							
		Submitted Yes/No (Hard copy Pg No.)										
33	SME 124833	Network Switches: 24 Port à 24 x 10/100Mbps + 2 100/1000 SFP + 2 Combo 10/100/1000BASE-T/SFP, 12 Gbps Switching Capacity/9 Mpps Forwarding capacity/384 Kb Packet Buffer	UL	CE	FCC							
		Submitted Yes/No (Hard copy Pg No.)										
34	SME 124834	Network Switches: 48 Port à 48 x 10/100Mbps + 2 100/1000 SFP + 2 Combo 10/100/1000BASE-T/SFP, 17 Gbps Switching Capacity/13 Mpps Forwarding capacity/1.5 MB Packet Buffer	UL	CE	FCC							
		Submitted Yes/No (Hard copy Pg No.)										
35	SME 124835	Network Switches: 8 x 10/100/1000 PoE Switch and 4 1G Base-X ports with 1.6Gbps Switching Capacity/1Mpps Forwarding capacity/384 Kb Packet Buffer or higher										
		Submitted Yes/No (Hard copy Pg No.)	UL	CE	FCC							
36	SME 124836	Network Switches:24 port • 24 x 10/100PoESwitch with 12 Gbps Switching Capacity/9 Mpps Forwarding capacity/512 Kb Packet Buffer higher	UL	CE	FCC							
		Submitted Yes/No (Hard copy Pg No.)										
		Submitted Yes/No (Hard copy Pg No.)										

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ITEM Code: SME 1248

Tender No.: KE

-A

S No	Sub item Code	Detail	Certification										
37	SME 124837	Network Management System: License for 25 Nodes											
		Submitted Yes/No (Hard copy Pg No.)											
38	SME 124838	Network Management System: License for 50 Nodes	UL	CE			FCC						
		Submitted Yes/No (Hard copy Pg No.)											
39	SME 124848	Core Switches: 4 Slot Chassis Switch with single CPU engine	UL	CE			FCC						
		Submitted Yes/No (Hard copy Pg No.)											
40	SME 124849	Core Switches: 12 Slot Chassis Switch with Dual CPU engine	UL										
		Submitted Yes/No (Hard copy Pg No.)											
41	SME 124850	Transceivers: 1G Transceivers for Single Mode Fiber	UL										
		Submitted Yes/No (Hard copy Pg No.)											
42	SME 124851	Transceivers: 10G Transceivers for Single Mode Fiber	UL										
		Submitted Yes/No (Hard copy Pg No.)											
43	SME 124852	CPU Engine for Chassis	UL										
		Submitted Yes/No (Hard copy Pg No.)											
44	SME 124853	Power Module for Chassis											
		Submitted Yes/No (Hard copy Pg No.)											
45	SME 124854	Line Cards compatible with above Chassis: 24 ports 10/100/1000Base-T Module											
		Submitted Yes/No (Hard copy Pg No.)											

SpecCCTV(Outdoor)e-T2015

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ITEM Code: SME 1248

Tender No.: KE -A

S No	Sub item Code	Detail	Certification										
46	SME 124855	Line Cards compatible with above Chassis: 24 ports 10/100/1000Base-T PoE Module											
		Submitted Yes/No (Hard copy Pg No.)											
47	SME 124856	Line Cards compatible with above Chassis:48 ports SFP Module											
		Submitted Yes/No (Hard copy Pg No.)											
48	SME 124857	Line Cards compatible with above Chassis:24 ports 10/100/1000Base-T and 24 ports SFP Module											
		Submitted Yes/No (Hard copy Pg No.)											
49	SME 124858	Line Cards compatible with above Chassis:6 ports 10G XFP Module											
		Submitted Yes/No (Hard copy Pg No.)											
50	SME 124859	Line Cards compatible with above Chassis:16 10GE SFP+ Module											
		Submitted Yes/No (Hard copy Pg No.)											
51	SME 124860	Expansion Modules for 8 Port & 24 Port 10G Layer 3 Switch:8 x 1000BASE-T expansion module											
		Submitted Yes/No (Hard copy Pg No.)											
52	SME 124861	Expansion Modules for 8 Port & 24 Port 10G Layer 3 Switch:8 x 10G SFP+ expansion module	EAL2 or NDPP										
		Submitted Yes/No (Hard copy Pg No.)											

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Item: CCTV (outdoor) System  
ITEM Code: SME 1248

Tender No.: KE

-A

S No	Sub item Code	Detail	Certification										
53		Power Supplies for Chassis Switches:Power Modules	EAL2 or NDPP										
		Submitted Yes/No (Hard copy Pg No.)											
54	SME 124862	Redundant Power Supplies for Switches:60W Single Redundant Power Supply	EAL2 or NDPP										
		Submitted Yes/No (Hard copy Pg No.)											
55	SME 124863	Redundant Power Supplies for Switches: 140W Single Redundant Power Supply											
		Submitted Yes/No (Hard copy Pg No.)											
56	SME 124864	Redundant Power Supplies for Switches: 1200W Single Redundant Power Supply											
		Submitted Yes/No (Hard copy Pg No.)											
57	SME 124865	Redundant Power Supplies for Switches: 589Watt Redundant Power Supply system											
		Submitted Yes/No (Hard copy Pg No.)											
58	SME 124866	Network Router:Fixed Router	UL										
		Submitted Yes/No (Hard copy Pg No.)											
59	SME 124867	Modular Multi-Service Integrated Router:Physical Interface – 2 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 1 slot for a CF card	UL	FCC									
		Submitted Yes/No (Hard copy Pg No.)											

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ITEM Code: SME 1248

Tender No.: KE

-A

S No	Sub item Code	Detail	Certification										
60	SME 124868	Modular Multi-Service Integrated Router: Physical Interface – 2 * 10/100/1000 Mbps Gigabit Ethernet port, 16 * 10/100/1000 Mbps Ethernet port, 1 USB Interface, 1 console port, 1 AUX port, 4 HIC slots	UL, FCC										
		Submitted Yes/No (Hard copy Pg No.)											
61	SME 124869	Modular Multi-Service Integrated Router: Physical Interface -- 2 * 10/100/1000 Mbps Gigabit Ethernet port, 1 USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 2 interface slots											
		Submitted Yes/No (Hard copy Pg No.)											
62	SME 124870	Modular Multi-Service Integrated Router: Physical Interface -- 4 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 4 HIC slots, 6 interface slots											
		Submitted Yes/No (Hard copy Pg No.)											
63	SME 124871	Modular Multi-Service Integrated Router: Physical Interface -- 4 * 10/100/1000 Mbps Gigabit Ethernet port, 1 * USB Interface, 1 console port, 1 AUX port, 8 interface slots											
		Submitted Yes/No (Hard copy Pg No.)											
64	SME 124872	Modules for above Routers: Single-path gigabit- Ethernet card											
		Submitted Yes/No (Hard copy Pg No.)											
65	SME 124873	Modules for above Routers: One port 10/100/1000M Base-T SFP card											
		Submitted Yes/No (Hard copy Pg No.)											

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Tender No.: KE

-A

S No	Sub item Code	Detail	Certification										
66	SME 124874	Modules for above Routers: Single-path E1 card											
		Submitted Yes/No (Hard copy Pg No.)											
67	SME 124875	Modules for above Routers: Dual-path E1 card											
		Submitted Yes/No (Hard copy Pg No.)											
68	SME 124876	Modules for above Routers: Single-path serial card											
		Submitted Yes/No (Hard copy Pg No.)											
69	SME 124877	Modules for above Routers: Dual-path serial card											
		Submitted Yes/No (Hard copy Pg No.)											
70	SME 124878	Modules for above Routers: One port ISDN BRI card											
		Submitted Yes/No (Hard copy Pg No.)											
71	SME 124879	Modules for above Routers: 8-path asynchronous serial card											
		Submitted Yes/No (Hard copy Pg No.)											
72	SME 124880	Modules for above Routers: 16-path FE switching module											
		Submitted Yes/No (Hard copy Pg No.)											
73	SME 124881	Modules for above Routers: 4-path channelized E1 module											
		Submitted Yes/No (Hard copy Pg No.)											
74	SME 124882	Modules for above Routers: 8-path channelized E1 module											
		Submitted Yes/No (Hard copy Pg No.)											

SpecCCTV(Outdoor)e-T2015

Seal and Signature of Tenderer

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Item: CCTV (outdoor) System

Tender No.: KE

-A

ITEM Code: SME 1248

S No	Sub item Code	Detail	Certification										
75	SME 124883	Modules for above Routers: 4-path E1 module											
		Submitted Yes/No (Hard copy Pg No.)											
76	SME 124884	Redundant Power Supplies for above Routers											
		Submitted Yes/No (Hard copy Pg No.)											
77	SME 124885	Wireless: Wireless N 150 Router											
		Submitted Yes/No (Hard copy Pg No.)											
78	SME 124886	Wireless: Wireless N 150 Cloud Router											
		Submitted Yes/No (Hard copy Pg No.)											
79	SME 124887	Wireless: Wireless AC 750 Cloud Router											
		Submitted Yes/No (Hard copy Pg No.)											
80	SME 124888	ADSL:ADSL2+ 1 Port Ethernet/USB Combo Router											
		Submitted Yes/No (Hard copy Pg No.)											
		Submitted Yes/No (Hard copy Pg No.)											
81	SME 124889	Wireless ADSL: Wireless N150 ADSL2+ 4 Port Ethernet Router											
		Submitted Yes/No (Hard copy Pg No.)											
82	SME 124890	Wireless: Wireless N300 ADSL2+ 4-Port Ethernet Router with USB											
		Submitted Yes/No (Hard copy Pg No.)											
83	SME 124891	Wireless PCI: Wireless N150 Desktop PCI Adapter											
		Submitted Yes/No (Hard copy Pg No.)											

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S No	Sub item Code	Detail	Certification										
84	SME 124892	Wireless USB:Wireless N150 Pico USB Adapter											
		Submitted Yes/No (Hard copy Pg No.)											
85	SME 124893	Wireless USB :Wireless N150 USB Adapter											
		Submitted Yes/No (Hard copy Pg No.)											
86	SME 1248145	Network Video Recorder, Monitoring Software & Storage – 16Ch Network Video Recorder with 24 TB HDD	UL		CE								
		Submitted Yes/No (Hard copy Pg No.)											
87	SME 1248146	Network Video Recorder, Monitoring Software & Storage – 8 Ch Network Video Recorder with 24 TB HDD	UL		CE								
88	SME 1248147	Network Video Recorder, Monitoring Software & Storage – 4 Ch Network Video Recorder with 24 TB HDD	UL		CE								
		Submitted Yes/No (Hard copy Pg No.)											
89	SME 1248148	Access Points: Wireless Outdoor Long Distance Bridge (Single Radio) Backhaul Application - Point-to-MultiPoint Base Station Radio	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											
90	SME 1248149	Access Points: Wireless Outdoor Long Distance Bridge (Single Radio) Backhaul Application - Sectoral Antenna 17 dBi -	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											

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ITEM Code: SME 1248

Tender No.: KE

-A

S No	Sub item Code	Detail	Certification										
91	SME 1248150	Access Points: Wireless Outdoor Long Distance Bridge (Single Radio) Backhaul Application - Remote Station Unit (CPE Unit)	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											
92	SME 1248151	Access Points: Wireless Outdoor Long Distance Bridge (Single Radio) Backhaul Application - Point-to-Point Radio High Capacity	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											
93	SME 1248152	Access Points: Wireless Outdoor Long Distance Bridge (Single Radio) Backhaul Application - Point to Point up to 125 Mbps	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											
94	SME 1248153	Access Points: Wireless Outdoor Long Distance Bridge (Single Radio) Backhaul Application - Up to 200 Mbps – Low Distance up to 20 KM	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											
95	SME 1248154	Out Door- Aggregation switch : Layer3 Switch: 24 100/1000 Base-X Ports and 4 1G/10G SFP+ slots	UL	CE	FCC								
		Submitted Yes/No (hard copy pg.no.)											

**Note: Authorization (D-III) and Quality Certification of the product in the tender must be in English only or original certificate with translation in English from Government recognized translator otherwise the tender is liable to be rejected**

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Item: CCTV (Outdoor) & IP Surveillance and add-ons  
ITEM Code: SME 1248

Tender No.: KE- -A